Land Use, Scenario Planning, & Sustainability Technical Report




GCMPC
GENESEE COUNTY METROPOLITAN PLANNING COMMISSION

Genesee County
2040 Long Range Transportation Plan
GeneSEE the Future: Mobility 2040

GENESEE COUNTY METROPOLITAN ALLIANCE

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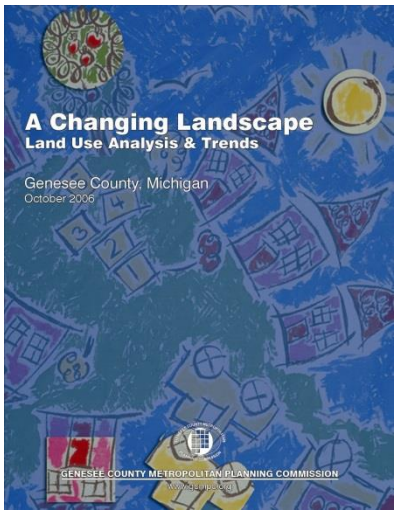


In 2006, the Genesee County Metropolitan Planning Commission (GCMPC) performed an analysis of the past and current land use trends in Genesee County. Since this time, staff has worked to produce county-wide population and employment projections out to the year 2040. With the completion of these projections, staff has taken the land use analysis to the next step by developing future land use trends for the County.

The 2006 analysis proved to us that urban sprawl had been occurring at a very rapid rate in Genesee County for the past thirty-five years. While the population from 1978 to 2006 actually decreased by about 1%, developed land in the county increased by 85%. During this same time period over 90,000 acres of farmland, forests, open range, and wetlands had been developed. Land use trends in the county relied heavy on land consumption with the majority of development occurring on agricultural lands and other open spaces. While new development during this time period was largely residential; commercial and industrial expansion was also occurring (see Appendix A: *A Changing Landscape*). This analysis also revealed that a disproportionate amount of this development was occurring in the rural townships while a lack of growth was occurring in the core urban districts of the county.

Most recently, an economic downturn between 2005 and 2010 has played a significant role in communities throughout Genesee County. After a significant reduction in employment, the 2040 Socioeconomic Projections indicate a gradual increase in employment county-wide from 2010 forward. An increase in employment would impact the built environment with the construction of new buildings or through the redevelopment and the renovation of older urban structures. GCMPC staff has developed four (4) separate scenarios to explore various development possibilities (scenarios) and how these possibilities could affect Genesee County's transportation system.

<u>2040 Population Projections</u>

By the year 2040, it is projected that Genesee County will have 423,030 residents. While there are specific areas county-wide expected to increase

in the next 25 years, a general trend continues with the City of Flint. The City of Flint has and is projected to continue to lose significant populations as will the urban townships surrounding the city. Between 1980 and 2010, Flint's population has reduced nearly 60,000 residents, averaging 20,000 per decade with approximately 1/3 of those residents departing in the last five years alone. The City of Flint, coupled with Flint, Mt. Morris, and Genesee Townships account for a decrease of almost 70,000 residents since 1980. Suburban towns and townships generally continue to gain population between 2010 and 2040, with the largest increases occurring in the townships. Grand Blanc, Mundy, and Fenton townships alone see an influx of nearly 16,000 residents. Overall, the county projects a decrease of 2,760 residents from 2010 to 2040.

Genesee County Population Change

Local Unit	1980	2005	2010	2040	2010 to 2040 Change	2010 to 2040 % Change
Genesee County	450,440	449,150	425,790	423,030	-2,760	-0.6%
Argentine Township	4,180	6,943	6,913	7,886	973	14.1%
Atlas Township	4,096	6,215	6,133	6,768	635	10.4%
Clayton Township	7,269	7,700	7,611	8,581	970	12.7%
Davison Township	13,708	19,180	19,575	22,932	3,357	17.1%
Fenton Township	9,570	14,665	15,552	19,020	3,468	22.3%
Flint Township	35,405	33,720	31,890	31,646	-244	-0.8%
Flushing Township	9,246	10,596	10,640	11,363	723	6.8%
Forest Township	3,559	3,931	3,838	3,993	155	4.0%
Gaines Township	4,769	6,420	6,442	7,305	863	13.4%
Genesee Township	25,065	23,981	21,595	21,300	-295	-1.4%
Grand Blanc Township	24,413	35,075	37,500	45,734	8,234	22.0%
Montrose Township	6,164	6,496	6,224	6,499	275	4.4%
Mt. Morris Township	27,928	23,795	21,460	21,684	224	1.0%
Mundy Township	10,786	14,810	15,063	19,695	4,632	30.8%
Richfield Township	6,895	8,726	8,730	10,005	1,275	14.6%
Thetford Township	8,499	8,385	7,049	7,288	239	3.4%
Vienna Township	12,914	13,627	13,255	14,677	1,422	10.7%
City of Burton	29,976	31,305	29,999	31,821	1,822	6.1%
City of Clio	2,669	2,586	2,646	2,711	65	2.5%
City of Davison	6,087	5,529	5,173	5,046	-127	-2.5%
City of Fenton	8,098	11,625	11,746	12,861	1,115	9.5%
City of Flint	159,611	120,283	102,486	67,133	-35,353	-34.5%
City of Flushing	8,624	8,464	8,389	8,541	152	1.8%
City of Grand Blanc	6,848	8,078	8,276	8,674	398	4.8%
City of Linden	2,174	3,603	3,991	4,514	523	13.1%
City of Montrose	1,706	1,552	1,657	1,745	88	5.3%
City of Mt. Morris	3,246	3,448	3,127	3,393	266	8.5%
City of Swartz Creek	5,013	5,493	5,726	6,564	838	14.6%
Village of Gaines	440	450	380	380	0	0.0%
Village of Goodrich	795	1,566	1,860	2,396	536	28.8%
Village of Otisville	682	903	864	875	11	1.3%

Table 1: Genesee County Population Change

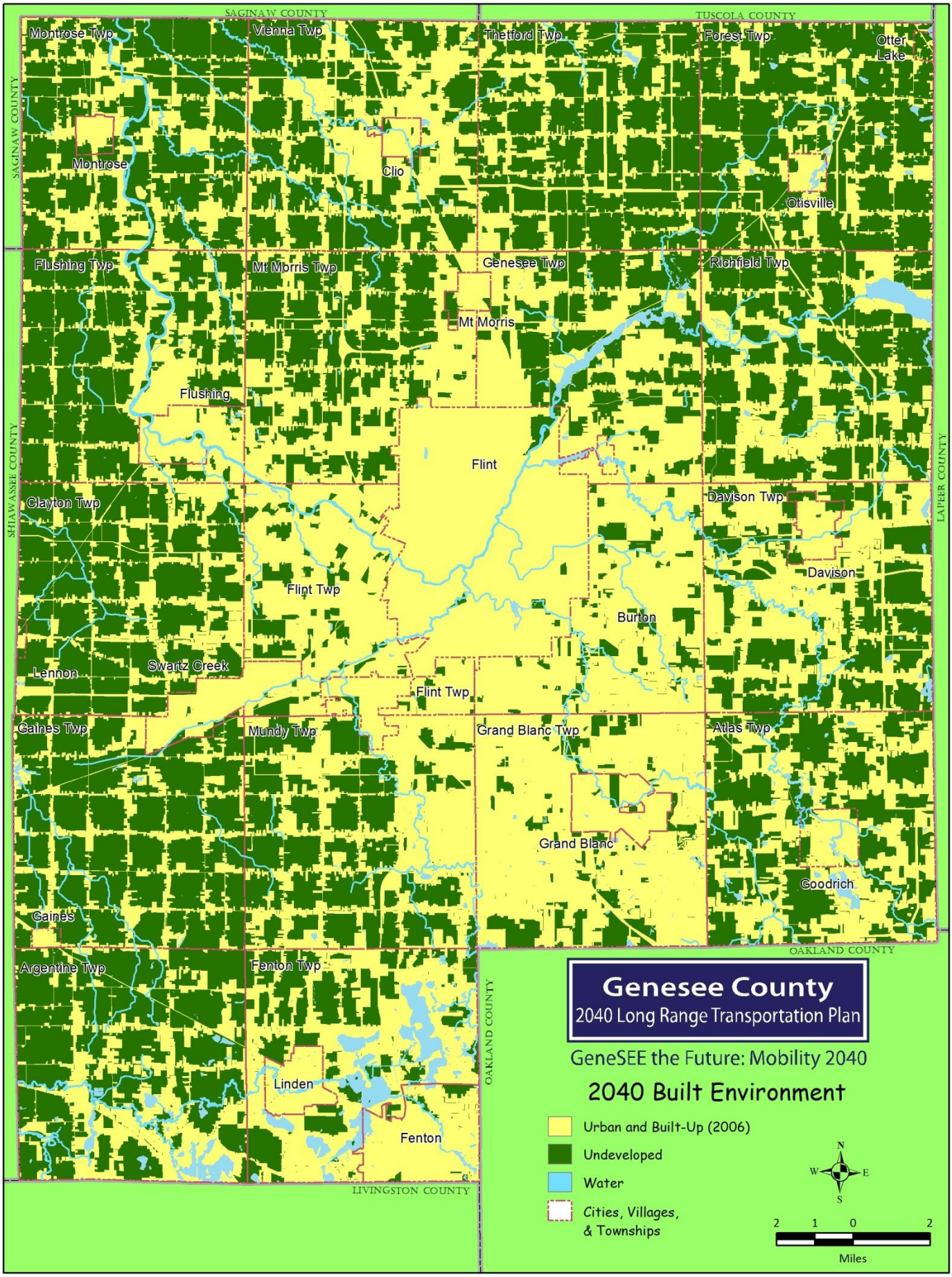


Figure 1: 2040 Built Environment

2040 Built Environment Projection

To expand on the analysis completed in 2006, GCMPC has projected the "Built Environment" out to the year 2040. During the development of the 2006 analysis, the County's base year population totaled 449,150 residents. When calculating the 2040 Built Environment, the base year had decreased to 425,790. A challenge faced during projections was the immense population loss in the City of Flint. The City of Flint alone has had a population decrease of on average 20,000 residents per decade since 1980. The large loss in population will more likely be observed in land consumption with occupancy of existing structures first, followed by new development. In the upcoming scenarios, staff has developed three alternative scenarios where the City of Flint's population numbers are stabilized, contrary to current 2040 projections.

The built environment —made up of residential, commercial, industrial and other developments— is still expected to grow at a significant rate. By 2040, it is projected that developed land in Genesee County will have increased by 104% since the first inventory was completed in 1978. At the same time, the county is expected to lose 37% of undeveloped land—farmland, forested lands, rangelands, and wetlands. In the 1980's and 1990's, heavy land consumption was concentrated in the townships. The 2040 projection shows this trend continuing. In the townships alone, over 97,000 acres of undeveloped land will have been developed since 1980. This amount, coupled with the growth expected to occur in the cities, climbs the total amount of undeveloped land consumed in the county to nearly 111,000 acres.

Growing Pains

Below is a survey of high growth areas in Genesee County. Notice the immense amount of land development occurring in these areas, while the populations tend to increase by much smaller amounts. In fact, all but four townships in the county consumed land at a rate twice as fast as the population growth, or faster.

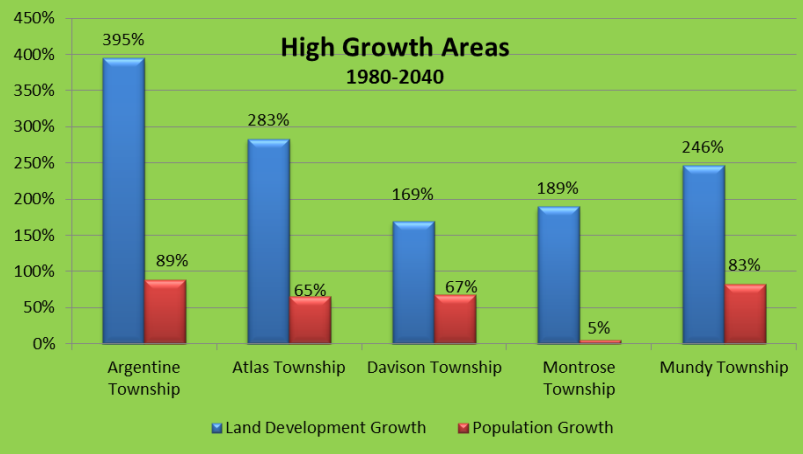


Figure 2: High Growth Areas

Land Use Trend: 1978 - 2040

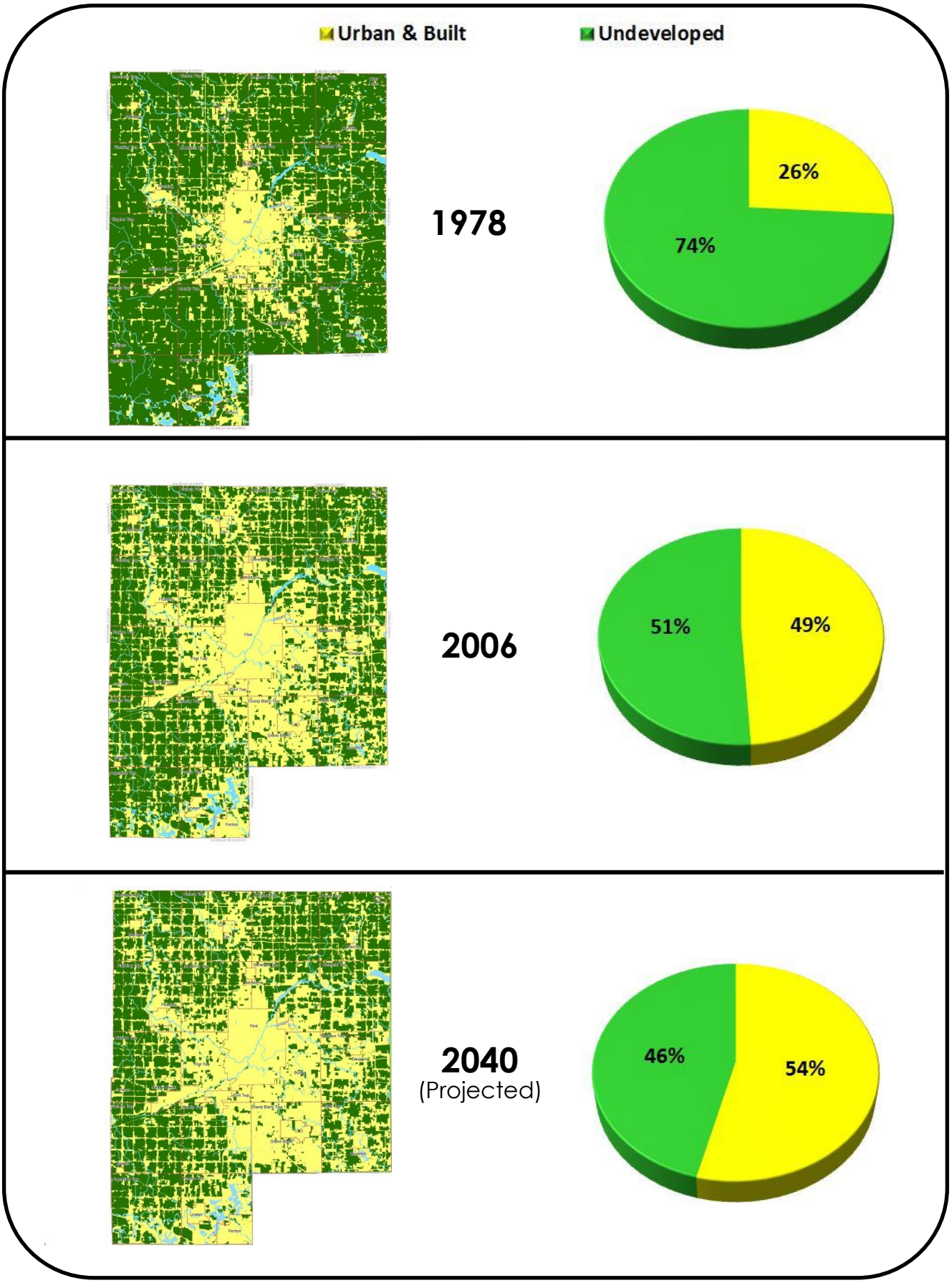


Figure 3: Land Use Trend 1978-2040

Genesee County Land Use Comparison						
Local Unit	Acreage Type	1978 Acreage	2006 Acreage	Projected 2040 Acreage	Projected Acreage Change	Projected % Acreage Change
Genesee County	Urban & Built	107,126	197,785	218,066	110,940	104%
	Undeveloped	302,700	209,619	189,338	-113,362	-37%
Argentine Township	Urban & Built	1,556	6,140	7,700	6,144	395%
	Undeveloped	20,821	16,005	14,445	-6,376	-31%
Atlas Township	Urban & Built	2,751	9,659	10,543	7,792	283%
	Undeveloped	18,372	11,415	10,531	-7,841	-43%
Clayton Township	Urban & Built	2,309	5,737	6,711	4,402	191%
	Undeveloped	19,433	15,975	15,001	-4,432	-23%
Davison Township	Urban & Built	4,648	10,396	12,520	7,872	169%
	Undeveloped	16,721	10,904	8,780	-7,941	-47%
Fenton Township	Urban & Built	3,318	8,089	9,920	6,602	199%
	Undeveloped	11,944	6,979	5,148	-6,796	-57%
Flint Township	Urban & Built	8,361	12,248	12,347	3,986	48%
	Undeveloped	6,592	2,617	2,518	-4,074	-62%
Flushing Township	Urban & Built	3,201	6,844	7,226	4,025	126%
	Undeveloped	16,912	13,238	12,856	-4,056	-24%
Forest Township	Urban & Built	2,612	6,066	6,289	3,677	141%
	Undeveloped	19,383	15,960	15,737	-3,646	-19%
Gaines Township	Urban & Built	2,141	5,365	5,858	3,717	174%
	Undeveloped	20,080	16,815	16,322	-3,758	-19%
Genesee Township	Urban & Built	6,503	10,950	11,067	4,564	70%
	Undeveloped	12,130	7,666	7,549	-4,581	-38%
Grand Blanc Township	Urban & Built	6,592	15,315	18,621	12,029	182%
	Undeveloped	14,408	5,610	2,304	-12,104	-84%
Montrose Township	Urban & Built	2,632	7,398	7,618	4,986	189%
	Undeveloped	19,292	14,541	14,321	-4,971	-26%
Mt Morris Township	Urban & Built	6,425	10,117	10,166	3,741	58%
	Undeveloped	13,736	10,051	10,002	-3,734	-27%
Mundy Township	Urban & Built	3,616	9,252	12,521	8,905	246%
	Undeveloped	19,445	13,793	10,524	-8,921	-46%
Richfield Township	Urban & Built	3,710	8,222	9,614	5,904	159%
	Undeveloped	18,835	14,189	12,797	-6,038	-32%
Thetford Township	Urban & Built	3,437	6,884	6,906	3,469	101%
	Undeveloped	18,682	15,220	15,198	-3,484	-19%
Vienna Township	Urban & Built	4,909	9,675	10,767	5,858	119%
	Undeveloped	17,494	12,695	11,603	-5,891	-34%
City of Burton	Urban & Built	7,583	12,093	13,137	5,554	73%
	Undeveloped	7,391	2,838	1,794	-5,597	-76%
City of Clio	Urban & Built	430	587	607	177	41%
	Undeveloped	280	124	104	-176	-63%
City of Davison	Urban & Built	828	987	989	161	19%
	Undeveloped	438	200	198	-240	-55%
City of Fenton	Urban & Built	2,000	3,665	4,115	2,115	106%
	Undeveloped	2,206	662	212	-1,994	-90%
City of Flint	Urban & Built	19,192	20,993	20,993	1,801	9%
	Undeveloped	2,236	503	503	-1,733	-78%
City of Flushing	Urban & Built	1,690	2,058	2,104	414	24%
	Undeveloped	618	251	205	-413	-67%
City of Grand Blanc	Urban & Built	1,414	2,138	2,170	756	53%
	Undeveloped	886	157	125	-761	-86%
City of Linden	Urban & Built	703	1,323	1,489	786	112%
	Undeveloped	824	166	0	-824	-100%
City of Montrose	Urban & Built	371	476	498	127	34%
	Undeveloped	254	149	127	-127	-50%
City of Mt. Morris	Urban & Built	489	547	551	62	13%
	Undeveloped	246	188	184	-62	-25%
City of Swartz Creek	Urban & Built	1,276	2,376	2,477	1,201	94%
	Undeveloped	1,327	226	125	-1,202	-91%
Village of Gaines	Urban & Built	151	164	202	51	34%
	Undeveloped	87	74	36	-51	-59%
Village of Goodrich	Urban & Built	408	919	1,223	815	200%
	Undeveloped	1,003	479	175	-828	-83%
Village of Otisville	Urban & Built	273	475	490	217	79%
	Undeveloped	279	82	67	-212	-76%

Table 2: Genesee County Land Use Comparison

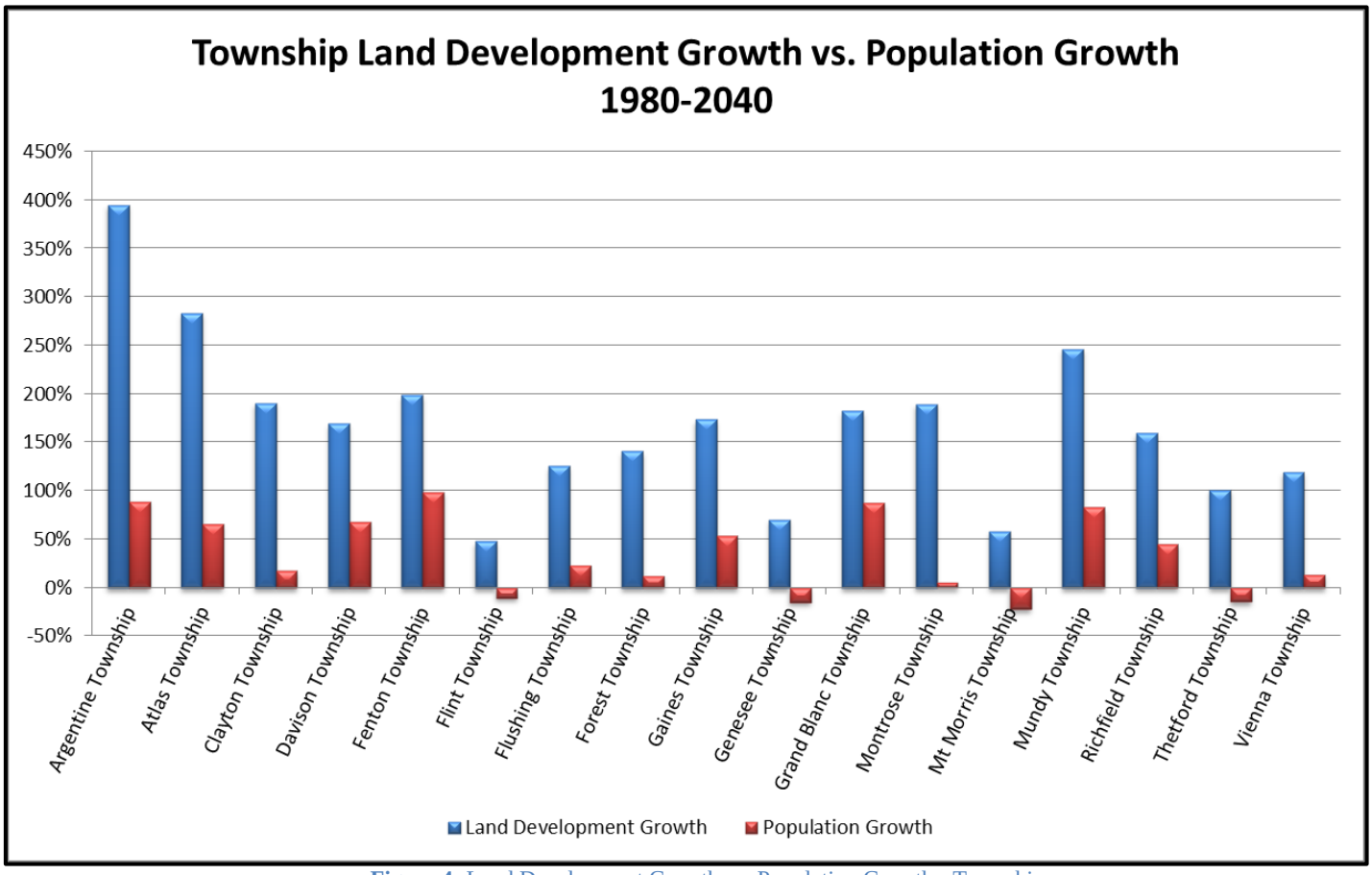


Figure 4: Land Development Growth vs. Population Growth - Township

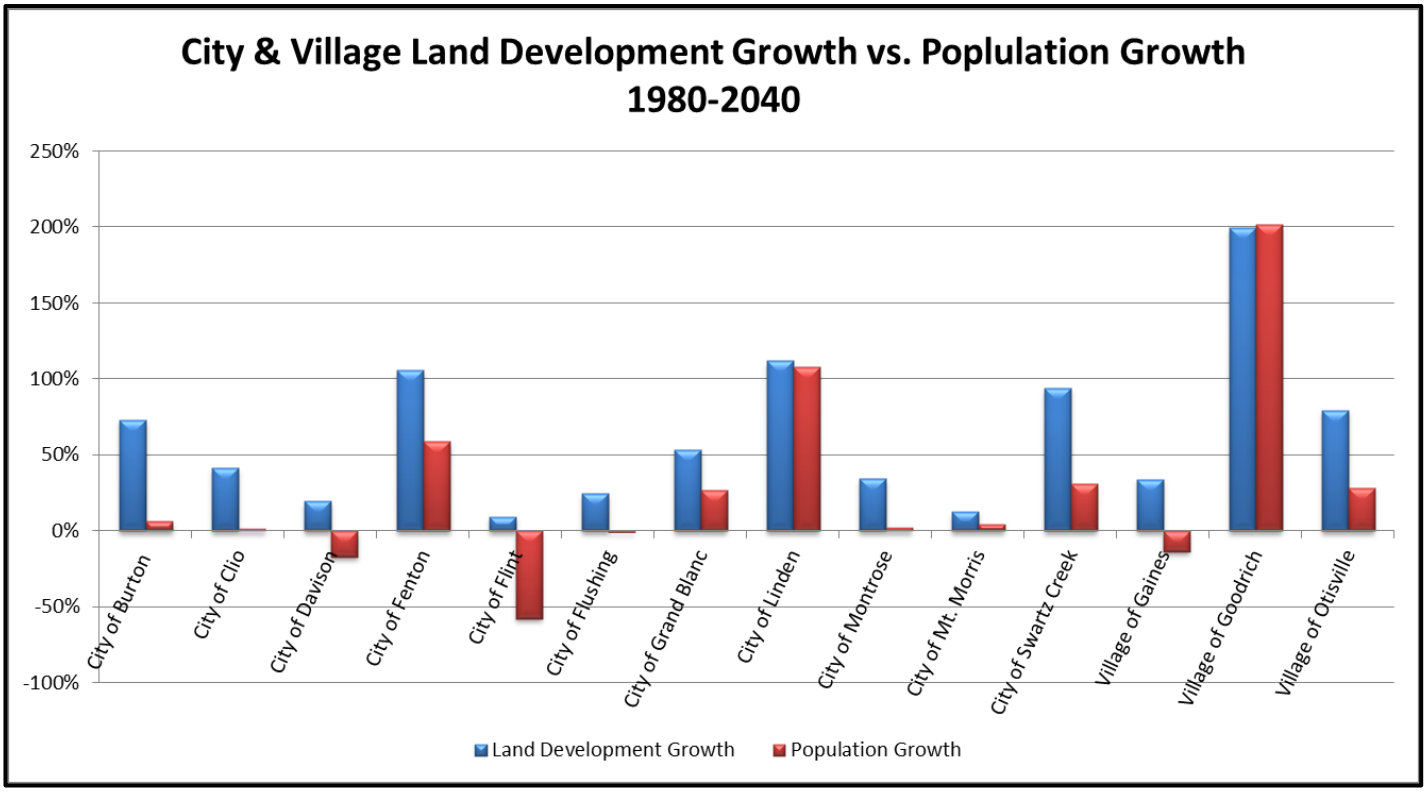


Figure 5: Land Development Growth vs. Population Growth – City & Village

Future Trends

As the progression of land use trend maps show, undeveloped land in our county is becoming a scarce resource and this trend is projected to continue over the next 25 years, but not nearly at the rates seen in the 1990's. The time period from 2006 to 2040 projects a 10% increase in developed land but at the same time population is projected to decrease by 6%. This trend suggests that from 2006 to 2040, land in Genesee County is projected to be used much more efficiently than in years past. Between 2006 and 2010 however, Genesee County experienced a significant reduction in population and employment. Moving forward, as population increases there will be a balance between occupancy of vacant homes and the development of new lands. Land consumption may not see the dramatic increases as in recent years due to an already built infrastructure such as unbuilt subdivisions.

Scenario Planning

Scenario Planning offers a way for Genesee County to explore various development possibilities (scenarios) and how these possibilities could affect the transportation system; more specifically, the levels of congestion that different development patterns may create. It allows planners and decision makers the ability to identify policies that can adapt to changes in development, population, employment and traffic congestion. This method of planning allows Genesee County a glimpse into our potential future depending on how and to what degree development occurs. Each scenario generates different effects on the transportation system. These scenarios are coded into the Travel Demand Model and the outputs of each can be compared for their different levels of congestion and environmental factors. The elements that change from scenario to scenario are population and levels of employment per traffic analysis zone (TAZ). The results from this exercise will be used to help make decisions during project development.

Development of Scenarios

Staff developed four scenarios for the 2040 Long Range Transportation Plan which includes Status Quo, Sustainable Growth, Hyper-Growth and Sustainable Hyper-Growth. Each scenario is described in detail below:

Status Quo Scenario – This is the business as usual scenario. This scenario shows population shifting away from the older urbanized areas to suburban and rural undeveloped areas. It uses the current population and employment growth rates that were approved by the Genesee County Metropolitan Alliance for use in the 2040 Long Range Transportation Plan which is a 15% growth in employment and -0.6% decline in population from 2010 to 2040.

Sustainable Growth Scenario* – This scenario uses the same employment and population growth rates as the Status Quo scenario. Growth is clustered near urbanized areas as a result of urban reinvestment and suburban planning.

Hyper-Growth Scenario* – This is the economic boom scenario. It shows inflated growth in population and employment with dispersed development. A 30% growth rate in employment and 30% growth rate in population were utilized to project into the year 2040.

Sustainable Hyper-Growth Scenario* – This is the urban reinvestment and economic boom scenario. This scenario combines the increased growth of the Hyper Growth Scenario (30% growth rate in employment and 30% growth rate in population by the year 2040), with the development patterns of the Sustainable Growth Scenario which clusters development in and around urbanized areas.

*For the Sustainable Growth, Hyper Growth, and Sustainable Hyper Growth scenarios, the City of Flint's population was held at 2020 projected levels.

Travel Demand Model Analysis

Using the Travel Demand Model we coded the four different scenarios into the Model by assigning the population and employment characteristics to Genesee County by the traffic analysis zone (TAZ). Once the four scenarios for 2040 were created, the model was used to determine how these four development scenarios would change the characteristics of travel in Genesee County.

Indicators

Each scenario will be evaluated against each other on the following indicators:

Indicators	**Evaluation Factors**
Land Cover & Development	Urban & Built-Up Land Area
	Lost Farmland & Open Space
	Increased Infrastructure Costs
	Increased School Needs
	Impervious Surface
Population and Jobs	Population
	Jobs
Mobility	Daily Hours of Traffic Delay
	Daily Vehicle Miles Traveled
	Congested Lane Miles of Roadway
	Lane Miles of Road LOS D or Greater
	% population reached (within a ¼ mile radius) by Fixed-Route Transit (2011-2040)
Environment	NOx Emissions
	VOC Emissions

Table 3: Evaluation Factors

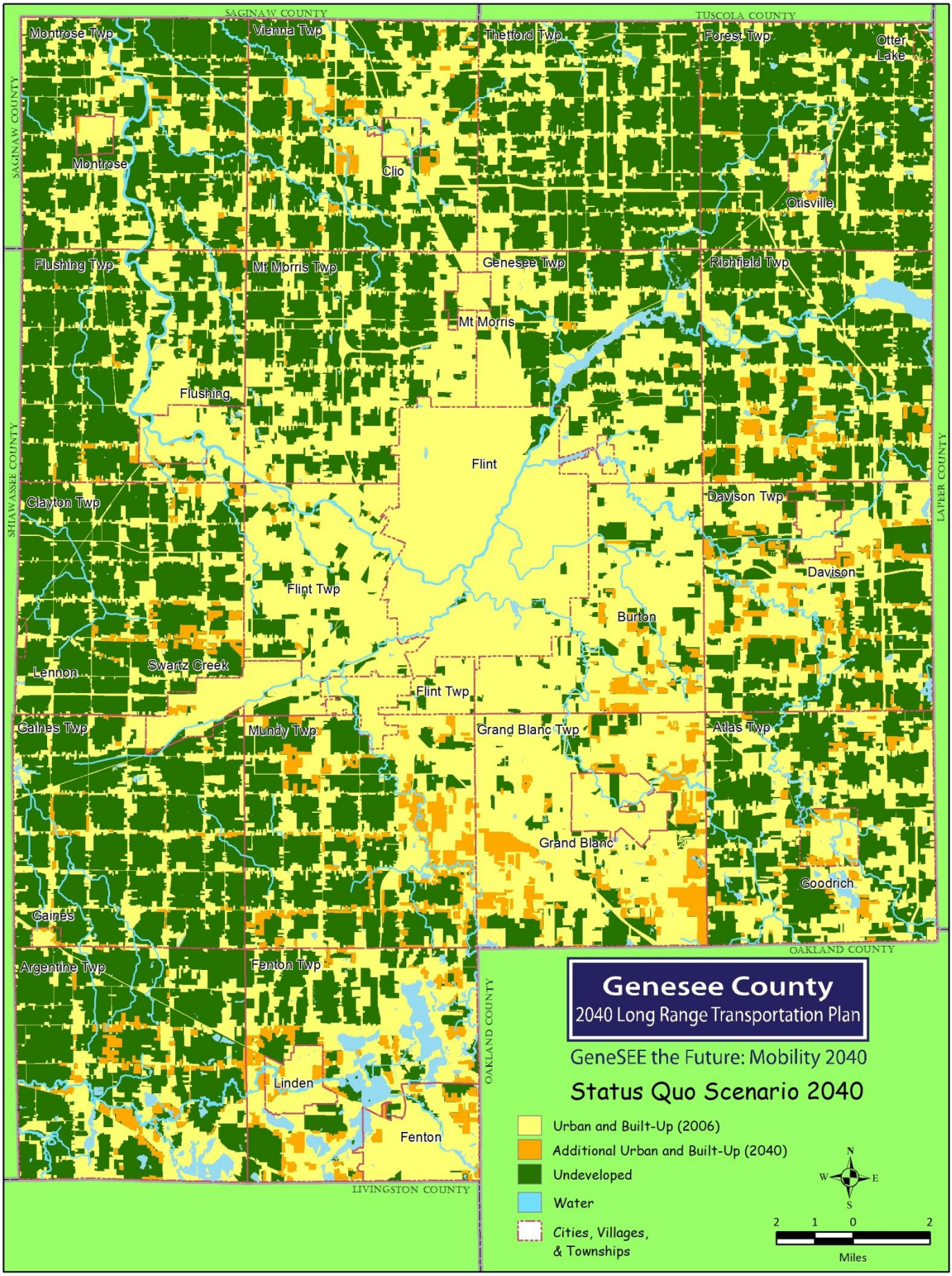


Figure 6: Status Quo Scenario 2040

Status Quo Scenario

Land Cover

Status Quo		
	Acreage	Percentage
Urban & Built	218,066	54%
Undeveloped	189,338	46%

The Status Quo scenario projects development into the year 2040 assuming Genesee County will continue to grow at a pace similar to recent years. The urbanization of undeveloped lands like forests and farmland occurs at a medium pace. In this scenario, the amount of urbanized land increases by 10% when compared to the amount of urbanized land in 2006.

Impervious surface

Impervious surfaces, including rooftops, roads, sidewalks, driveways, and parking lots, generally are expected to increase as development increases. As an area adds population and employment, homes are built and businesses often added. This new development equals an increase in impervious surfaces. In the Status Quo scenario, urbanized land is expected to increase by 10%, adding impervious surface as well.

Development Patterns

In this scenario, growth and development follow the same patterns that have been continuing in Genesee County. Population continues to decline in the City of Flint, and neighboring communities. Population increases in the suburban areas and rural communities on the fringes of the County. Development in the southern portion of Genesee County out paces development in the northern portion of Genesee County, largely due to the proximity of the commercial and economic prosperity in Oakland County and Livingston County directly to the south. This scenario produces random, leap-frog development along roadways in the suburban areas of the county. This type of development also produces a great need for costly infrastructure expansion, including sewer, water, police and fire protection and potential school expansion.

Population and Employment

The population, households and jobs in Genesee County are the official population projections for the 2040 Long Range Transportation Plan. A detailed methodology is included in the Transportation Model Technical Report of the 2040 LRTP. A list of the countywide totals is below:

Status Quo 2040 Scenario	
Population	**423,029**
Manufacturing Employment	8,909
Other Employment	10,766
Transportation Employment	5,176
Finance Employment	15,911
Retail Employment	22,315
Wholesale Employment	5,337
Service Employment	117,516
Government Employment	26,646
Total Employment	**212,576**

Mobility

The Status Quo Scenario has 10.01% of all the lane miles of roadway included in the Genesee County model as congested. The chart below lists the statistics from the model with no adjustments made. The levels of congestion are divided into four categories, urban area interstate/ freeway, urban area major and minor arterial and collectors, rural area interstate/ freeway, and rural area major and minor arterials and collectors. The National Functional Classification System (NFC) categories were aggregated to these four groups. For the total Genesee County Model network categories, the expressway interchange ramps were also added, they are not accounted for in the other categories.

Status Quo 2040 Scenario	Total Genesee County Model
Lane Miles Peak Hour Level of Service D	208.29
Lane Miles Peak Hour Level of Service E	133.42
Lane Miles Peak Hour Level of Service F	130.74
Total Congested Lane Miles (LOS E and F)	264.16
Total Lane Miles in Model Network	2637.19

Status Quo 2040 Scenario	Urban Area Interstate/Freeway	Rural Area Interstate/ Freeway	Urban Area Major & Minor Arterial & Collector	Rural Area Major & Minor Arterial & Collector	Urban Local Roads	Rural Local Roads	Total Genesee County Model
Daily Vehicle Miles Traveled	5,056,975	165,719	4,991,779	1,263,077	19,373	9,797	11,828,444
Daily Vehicle Hours Traveled	81,097	3,401	131,362	24,831	675	188.0	252,518
Average Speed	60.5	48.7	37.9	50.7	28.7	52.2	46.8
Daily Hours of Traffic Delay	4,295	68	2,600	429	5	-	7,679

Transit

The travel demand model predicts a 22.2% increase in population reached (within a ¼ mile radius) by the transit's primary route system from the 2011 base year to 2040 in the Status Quo Scenario. This is partially due to an increase in population on the fringe of urban areas which the fixed route transit system serves.

Environment

Greenhouse Gas Emissions	Kg/day
Volatile Organic Compounds (VOC)	4,898
Nitrogen Oxide (Nox)	4,559
Total	9,457

Transportation Planning must take into account the effects that automobiles have on air quality, automobiles account for the majority of ozone producing carbon emissions in metropolitan areas. Ozone (O_3) is a colorless and odorless gas composed of three oxygen atoms, that. It is not emitted directly into the air, but at ground level is created by a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. This ground level ozone is harmful to people and the environment. In order to measure the effects of air quality, we use Mobil 6.2 air quality modeling program. Mobil 6.2 produces a total VOC and NOx emissions for Genesee County for each scenario. The air quality results are based on the vehicle miles traveled, vehicle hours traveled and the average speeds for the different functional classifications of roadways in Genesee County. In terms of air quality, it is predicted that on average day in July, that 9,457 kilograms will be emitted into the air in the Status Quo scenario.

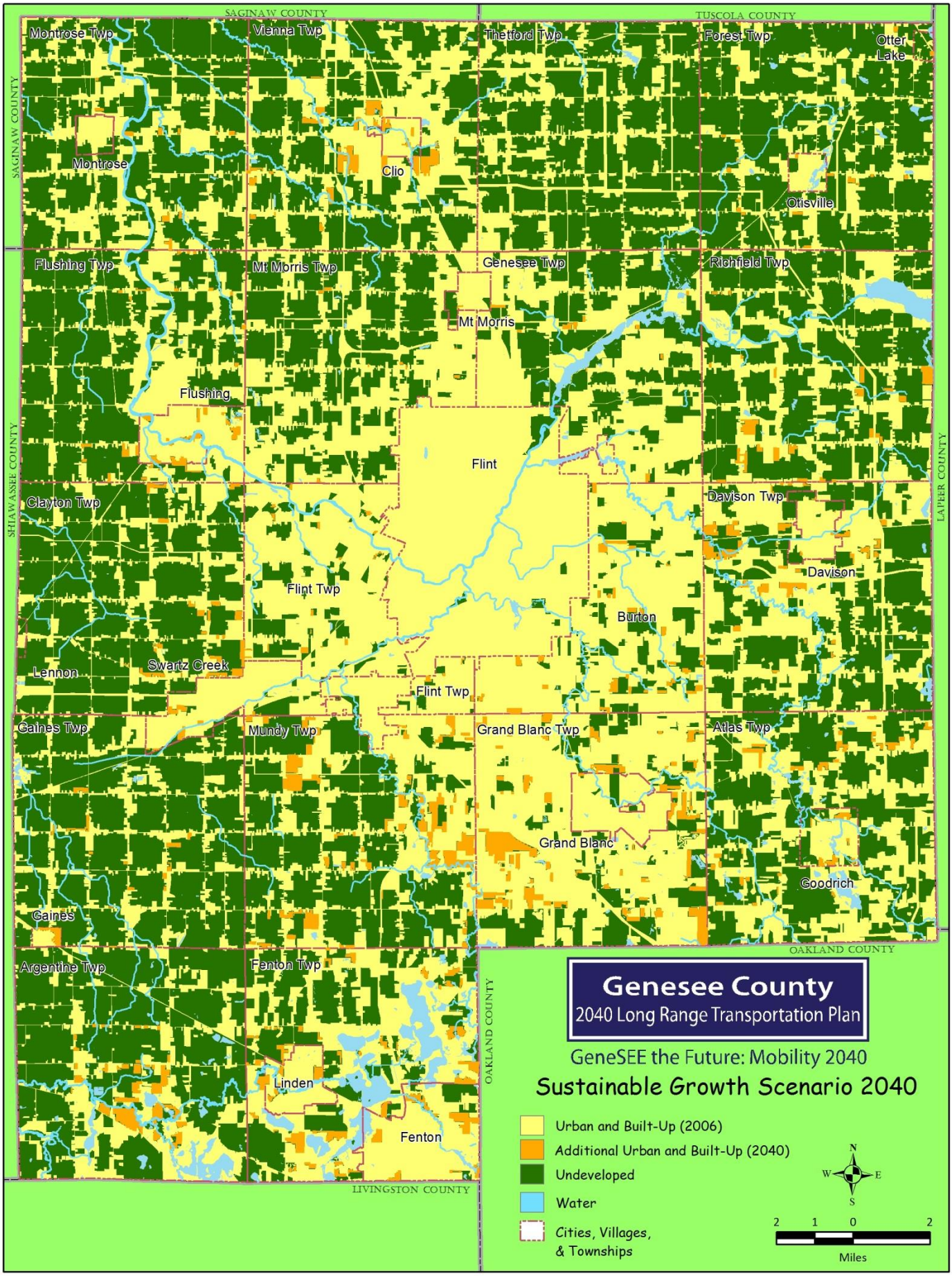


Figure 7: Sustainable Growth Scenario 2040

Sustainable Growth Scenario

Land Cover

Sustainable Growth		
	Acreage	Percentage
Urban & Built	208,856	51%
Undeveloped	198,548	49%

The Sustainable Growth scenario uses the same increases in population and employment as the Status Quo scenario, but directs those increases and the development that results into already established urban areas. The urbanization of undeveloped lands like forests and farmland occurs at a much slower pace than the Status Quo scenario, and, in fact, this scenario could preserve over 9,000 acres of undeveloped lands in the County. In this scenario, the amount of urbanized land increases by only 6% when compared to the same statistic in 2006.

Impervious surface

The general trend of added population and jobs increasing the impervious surface does not apply in this scenario. Impervious surfaces are diminished in this scenario. The Sustainable Growth scenario directs those increases towards already urbanized areas with existing infrastructure, keeping new developments to a minimum while rejuvenating older areas. With minimal increases in development, impervious surface is expected to remain constant.

Development Patterns

Growth is clustered in the urban areas in this scenario. This scenario's rate of growth is similar to the status quo scenario for the county, but only areas identified as urban area types in the travel demand model see growth. The reuse of urban areas through brownfield redevelopment and the renovation of older urban buildings maximize the use and benefit of existing infrastructure and minimize the need for costly new road, water, and sewer connections while preserving open space in the suburban and rural communities.

Population and Employment

Starting with the 2010 population data, a selection set of the urban and central business district (CBD) areas was created from the travel demand model. Population was added to the TAZs in the urban areas only and increased to 10% overall growth from 2010. The 2010-2040 percent growth was weighted based upon the 2010 population distribution for each TAZ. As previously described, this scenario analyzes investments in urbanized areas. The City of Flint has had a population decrease of on average 20,000 per decade. For this scenario, staff uses the 2020 City of Flint population for analysis. The City of Flint's 2020 Status Quo population, located in the CBD, was included into the projections following all growth calculations.

For employment, each of the eight employment sectors was treated separately. Each sector is growing or declining at a different rate in the Status Quo 2040 Employment Projections. For the sectors with growth, the 2010-2040 percent growth was distributed only in the urban areas weighted based upon the employment distribution in 2010 for each TAZ. For the employment sectors with a decline, no adjustments were made and they remained at Status Quo levels. The chart below shows the overall County totals in population and employment.

Sustainable Growth 2040 Scenario	
Population	**438,435**
Manufacturing Employment	8,909
Other Employment	10,766
Transportation Employment	5,176
Finance Employment	15,911
Retail Employment	22,315
Wholesale Employment	5,337
Service Employment	117,516
Government Employment	26,646
Total Employment	**212,576**

Mobility

The Sustainable Growth Scenario has 9.75% of all the lane miles of roadway included in the Genesee County model as congested. This is approximately the same level of area wide congestion as the status quo scenario; however the congestion is shifted from the suburban areas and concentrated in the urban areas of higher population, while traffic delay on the county system as a whole has also decreased. This is due to

lessening the demand for travel on the suburban roadway network. Location of employment in the urban areas and increased population there has increased the demand on urban interstates to bring commerce to these areas. The concentration of congestion to the urban areas can be seen as a positive indicator. This shift may symbolize a vital central business district. The concentrated development could increase tax base and reduce infrastructure costs. The increased traffic in these areas relaxes the need to build new roads and promotes the less costly preservation option as opposed to roadway expansion.

Sustainable Growth 2040 Scenario	Total Genesee County Model
Lane Miles Peak Hour Level of Service D	206.53
Lane Miles Peak Hour Level of Service E	132.45
Lane Miles Peak Hour Level of Service F	124.73
Total Congested Lane Miles (LOS E and F)	257.18
Total Lane Miles in Model Network	2,637.19

Sustainable Growth 2040 Scenario	Urban Area Interstate/Freeway	Rural Area Interstate/ Freeway	Urban Area Major & Minor Arterial & Collector	Rural Area Major & Minor Arterial & Collector	Urban Local Roads	Rural Local Roads	Total Genesee County Model
Daily Vehicle Miles Traveled	5,032,723	165,725	4,947,811	1,247,021	22,243	9,301	11,701,426
Daily Vehicle Hours Traveled	80,615	3,401	131,101	24,499	776	178.0	250,642
Average Speed	60.6	48.7	37.6	50.7	28.7	52.1	46.7
Daily Hours of Traffic Delay	4,186	68	2,428	407	8	-	7,341

Transit

The travel demand model predicts a 37.2% increase in population reached (within a ¼ mile radius) by the transit's primary route system from the 2011 base year to 2040 in the Sustainable Growth scenario. As the population is gradually increasing in communities neighboring the central business district (CBD), the population reached by the primary route transit system has increased when compared to the Status Quo scenario.

Environmental

Greenhouse Gas Emissions	Kg/day
Volatile Organic Compounds (VOC)	4,875
Nitrogen Oxide (Nox)	4,524
Total	9,399

In terms of air quality, it is predicted that on average day in July, that 9,399 kilograms will be emitted into the air in the Sustainable Growth scenario.

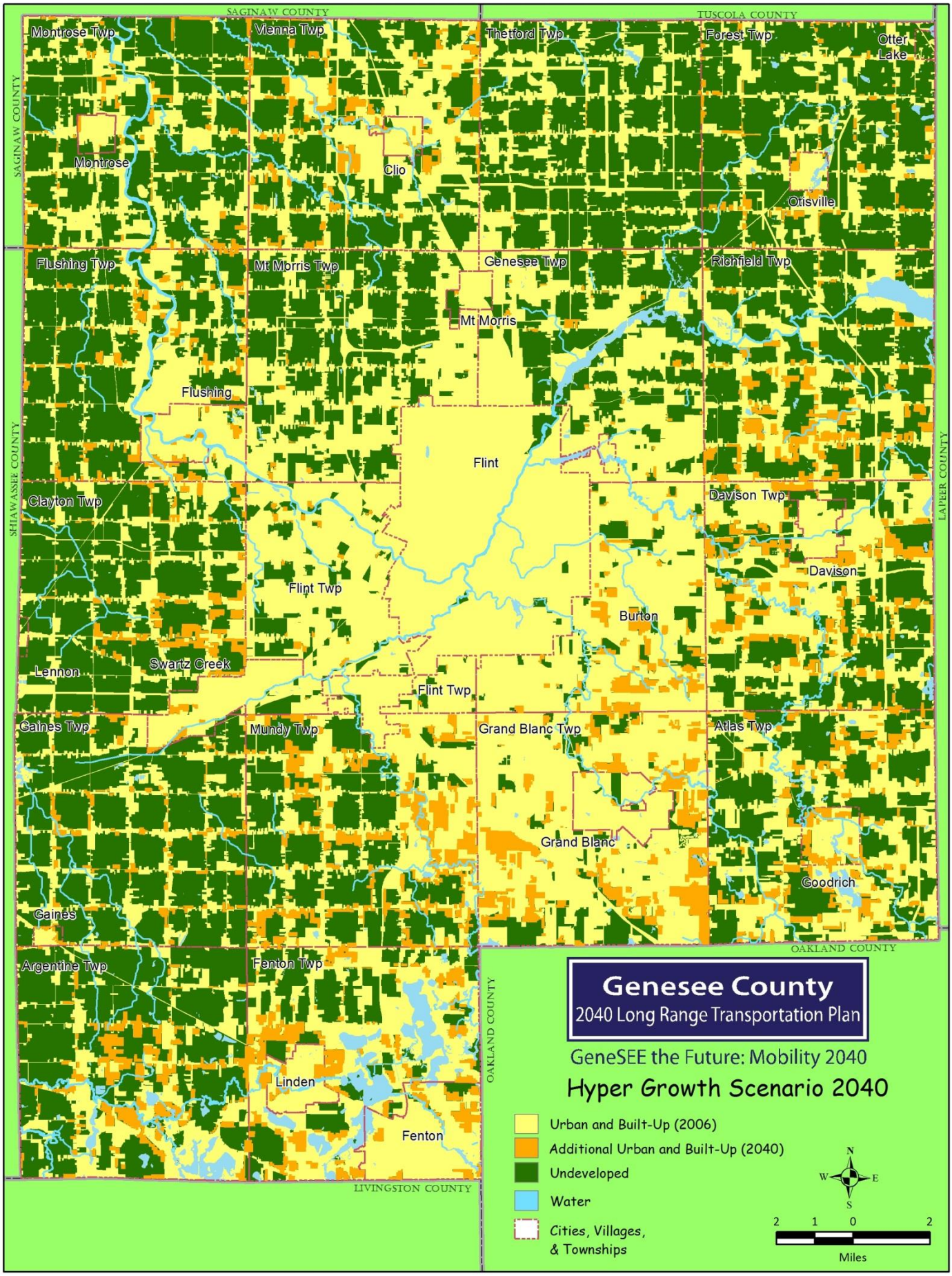


Figure 8: Hyper Growth Scenario 2040

Hyper Growth Scenario

Land Cover

Hyper Growth		
	Acreage	Percentage
Urban & Built	231,915	57%
Undeveloped	175,489	43%

The Hyper Growth scenario projects development in the same areas as does the Status Quo scenario, but does so at an accelerated rate. The accelerated urbanization of undeveloped lands like forests and farmland that this scenario represents could lead to a 17% increase in Urban & Built areas around the county. This scenario may lead to the haphazard consumption of over 13,000 acres of undeveloped land and nearly 60% of the county's land being urbanized.

Impervious surface

As seen in the Status Quo scenario, impervious surface increased significantly due to the increase in development. In the Hyper Growth scenario, this trend is only intensified, increasing urbanized land by 17%, and adding even more impervious surface.

Development Patterns

In this scenario, growth and development follow the same patterns that have been continuing in Genesee County but growth occurs at an accelerated rate (30% from 2010 - 2040). Population continues to decline in the City of Flint. Population increases in the suburban areas and rural communities on the fringes of the County. This type of growth continues to put increased demands on the capacity of transportation infrastructure, increases the need for more sewer and water lines to newly developing areas, and uses available open space and prime agricultural land for new development.

Population and Employment

Starting with the 2010 population data, a 30% overall growth was applied in all TAZ based upon the 2010 population distribution county-wide. All zones were treated equally (excluding the Central Business District); no additional population was added disproportionate to the 2010 population

estimates. The City of Flint's 2020 Status Quo population, located in the CBD, was included into the projections following all growth calculations.

For employment, each of the eight employment sectors was treated separately. Each sector is growing or declining at a different rate in the Status Quo 2040 Employment Projections. For the sectors with growth, the 30% growth was distributed to all areas equally weighted based upon the 2010 employment distribution in for each TAZ. For the employment sectors with a decline, no adjustments were made and they remained at Status Quo levels. The chart below shows the overall County totals in population and employment.

Hyper Growth 2040 Scenario	
Population	**502,838**
Manufacturing Employment	8,909
Other Employment	12,958
Transportation Employment	5,877
Finance Employment	15,911
Retail Employment	22,315
Wholesale Employment	5,337
Service Employment	116,381
Government Employment	31,994
Total Employment	**219,683**

Mobility

In the Hyper Growth Scenario, the amount of congested roadway in Genesee County will have increased to 10.42% by 2040. This is a slight increase of area wide congestion from the Status Quo scenario. Growth in the suburban and rural areas created more congested lane miles in the major and minor arterials and collectors in Genesee County. This scenario creates more dispersed, widespread congestion throughout the county, existing on all types of roadways in all areas.

Hyper Growth 2040 Scenario	**Total Genesee County Model**
Lane Miles Peak Hour Level of Service D	215.97
Lane Miles Peak Hour Level of Service E	120.48
Lane Miles Peak Hour Level of Service F	154.33
Total Congested Lane Miles (LOS E and F)	274.81
Total Lane Miles in Model Network	2,637.19

Hyper Growth 2040 Scenario	Urban Area Interstate/Freeway	Rural Area Interstate/ Freeway	Urban Area Major & Minor Arterial & Collector	Rural Area Major & Minor Arterial & Collector	Urban Local Roads	Rural Local Roads	Total Genesee County Model
Daily Vehicle Miles Traveled	5,246,687	165,720	5,546,775	1,369,595	23,065	10,825	12,702,831
Daily Vehicle Hours Traveled	85,027	3,401	146,506	27,021	801	209	274,645
Average Speed	59.6	48.7	37.7	50.5	28.8	51.9	46.3
Daily Hours of Traffic Delay	5,335	68	3,484	544	8	-	9,769

Transit

The travel demand model predicts a 35% increase in population reached (within a ¼ mile radius) by the transit's primary route system from the 2011 base year to 2040 in the Hyper Growth scenario. The increase is mainly attributed to the overall increase in population. It is slightly less of an increase compared to Sustainable Growth since population increases in the rural areas.

Environment

Greenhouse Gas Emissions	Kg/day
Volatile Organic Compounds (VOC)	5,325
Nitrogen Oxide (Nox)	4,934
Total	10,259

In terms of air quality, it is predicted that on average day in July, that 10,259 kilograms will be emitted into the air in the Hyper Growth scenario.

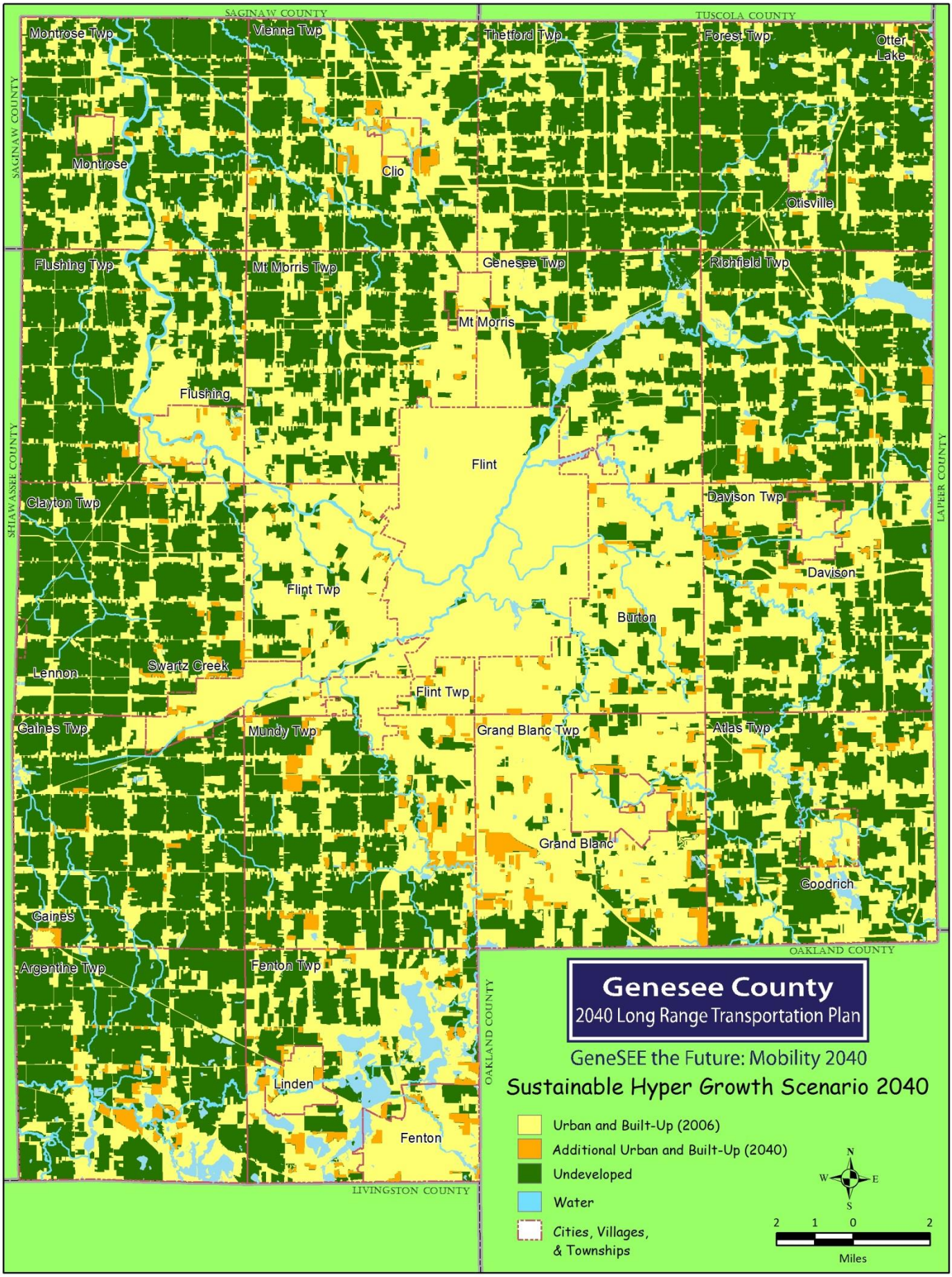


Figure 9: Sustainable Hyper Growth Scenario 2040

Sustainable Hyper Growth Scenario

Land Cover

Sustainable Hyper Growth		
	Acreage	Percentage
Urban & Built	209,359	51%
Undeveloped	198,045	49%

The Sustainable Hyper Growth scenario uses the same inflated increases in population and employment as the Hyper Growth scenario, but directs the increases and the development that results into already established urban areas. The urbanization of undeveloped lands like forests and farmland occurs at a much slower pace than the Hyper Growth Scenario as already urbanized areas are redeveloped and rejuvenated. In fact, this scenario could preserve over 8,000 acres of undeveloped lands in the County if sudden increases in population and employment were to occur. In this scenario, the amount of urbanized land increases by only 6%, instead of the wasteful 17% of the Hyper Growth scenario.

Impervious surface

Similar to the Sustainable Growth scenario which directs population and employment increases towards already urbanized areas with existing infrastructure, the Sustainable Growth scenario only shows minimal increases in development. With minimal increases in development, impervious surface is expected to only increase slightly.

Development Patterns

In the Sustainable Hyper Growth Scenario, growth and development follow the same patterns as the Sustainable Growth Scenario but at an accelerated rate, (30% increase from 2010-2040). Population growth occurs in the model urban area type only. The growth in these areas reuses existing urban land by increased brownfield redevelopment, in-fill housing and re-use of existing structures and land. This saves open space in the suburban and rural areas of Genesee County. Although population increases, the demand on infrastructure such as adding travel lanes in rural areas, and new water and sewer lines is minimized, while the reuse of existing infrastructure is capitalized. The need for consuming additional open space in rural areas is greatly diminished.

Population and Employment

Starting with the 2010 population data, a selection set of the urban and central business district (CBD) areas was created from the travel demand model. Population was added to the TAZs in the urban areas only and increased to 30% overall growth from 2010. The 2010-2040 percent growth was weighted based upon the 2010 population distribution for each TAZ. As previously described, this scenario analyzes investments in urbanized areas. The City of Flint has had a population decrease of on average 20,000 per decade. For this scenario, staff uses the 2020 City of Flint population for analysis. The City of Flint's 2020 Status Quo population, located in the CBD, was included into the projections following all growth calculations.

For employment, each of the eight employment sectors was treated separately. Each sector is growing or declining at a different rate in the Status Quo 2040 Employment Projections. For the sectors with growth, the 30% growth was distributed only in the urban areas weighted based upon the employment distribution in 2010 for each TAZ. For the employment sectors with a decline, no adjustments were made and they remained at Status Quo levels. The chart below shows the overall County totals in population and employment.

Sustainable Hyper Growth 2040 Scenario	
Population	**502,838**
Manufacturing Employment	8,909
Other Employment	12,958
Transportation Employment	5,877
Finance Employment	15,911
Retail Employment	22,315
Wholesale Employment	5,337
Service Employment	116,381
Government Employment	31,994
Total Employment	**219,683**

Mobility

The Sustainable Hyper Growth Scenario has 10.36% of all the lane miles of roadway included in the Genesee County model as congested. There is an increase in congestion from the Sustainable Growth scenario on the urban area interstate and freeways, but less congestion then the Hyper

Sustainable Hyper Growth 2040 Scenario	Total Genesee County Model
Lane Miles Peak Hour Level of Service D	200.32
Lane Miles Peak Hour Level of Service E	127.23
Lane Miles Peak Hour Level of Service F	146.09
Total Congested Lane Miles (LOS E and F)	273.32
Total Lane Miles in Model Network	2,637.19

Growth scenario on the suburban area roadways, effectively concentrating congestion in the urban area. In this scenario, congestion is much more concentrated in the dense urban areas, as opposed to the dispersed nature of congestion in the Hyper Growth scenario.

Sustainable Hyper Growth 2040 Scenario	Urban Area Interstate/Freeway	Rural Area Interstate/ Freeway	Urban Area Major & Minor Arterial & Collector	Rural Area Major & Minor Arterial & Collector	Urban Local Roads	Rural Local Roads	Total Genesee County Model
Daily Vehicle Miles Traveled	5,074,167	165,726	5,422,695	1,234,251	26,904	9,545	12,409,275
Daily Vehicle Hours Traveled	81,380	3,401	144,619	24,240	944	184.0	269,279
Average Speed	60.5	48.7	37.3	50.7	28.5	51.9	46.1
Daily Hours of Traffic Delay	4,318	68	3,272	401	15	-	9,144

Transit

The travel demand model predicts a 43.9% increase in population reached (within a ¼ mile radius) by the transit's primary route system from the 2011 base year to 2040 in the Sustainable Hyper Growth Scenario. This is due to the overall increase in population centered in the CBD which is serviced by the fixed route transit system.

Environment

In terms of air quality, it is predicted that on average day in July, that 10,055 kilograms will be emitted into the air in the Sustainable Hyper Growth scenario.

Greenhouse Gas Emissions	Kg/day
Volatile Organic Compounds (VOC)	5,229
Nitrogen Oxide (Nox)	4,827
Total	10,055

2040 Growth Scenarios: Urban & Built vs. Undeveloped

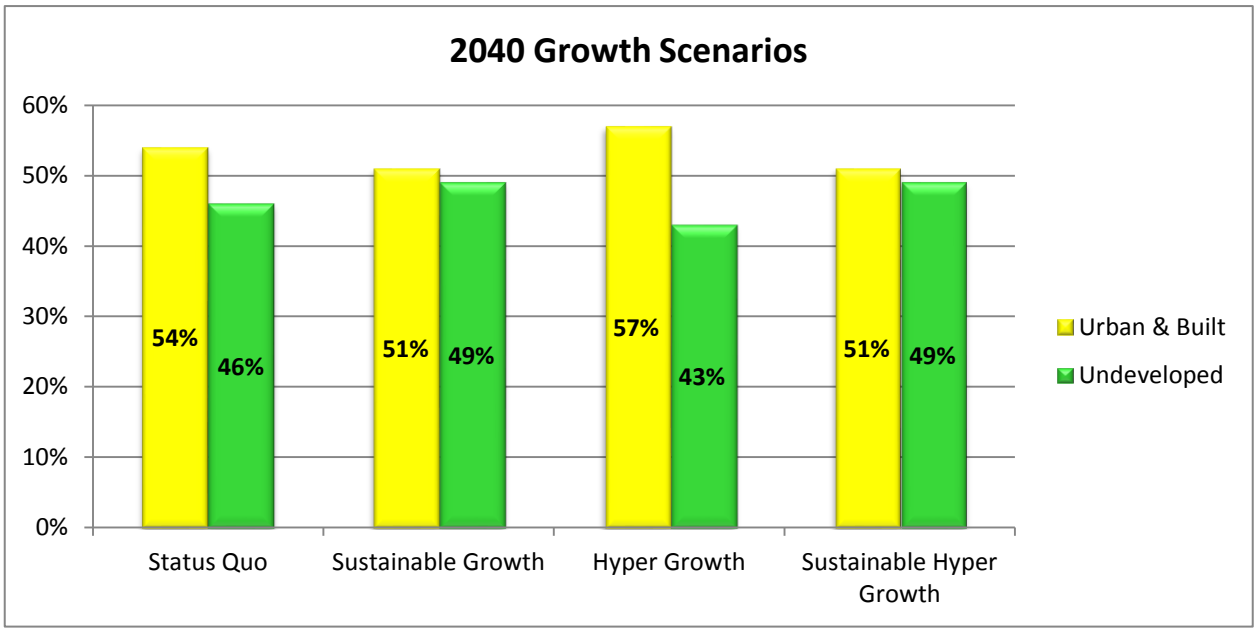


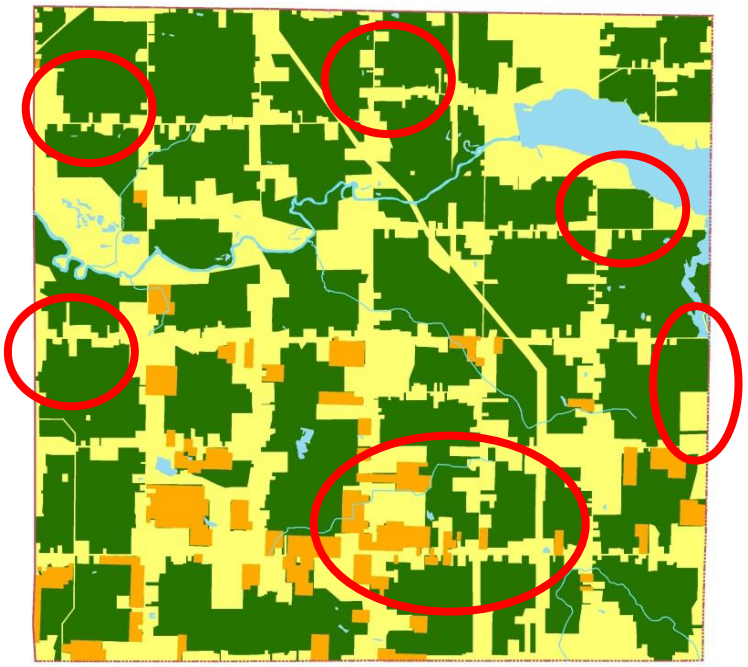
Figure 10: 2040 Growth Scenarios

After considering how each of the four growth scenarios generates different effects on the transportation system, we can compare the overall increase or decrease in urban & built land. There is the potential for more or less land consumption dependent on not only the amount of population but how local and county officials direct growth. For example, the above graph illustrates that through sustainable growth configurations, agricultural lands / open space can be preserved through the reuse of urban areas and renovation of older urban buildings. Even with an increase in population during the sustainable hyper growth scenario, the amount of urban & built land remains consistent with the sustainable growth scenario that contains less population.

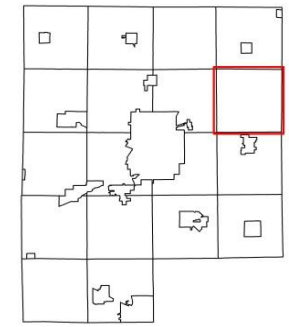
Community Land Use Profile – Richfield Township

The following illustrations take a closer look at the projected 2040 land consumption in Genesee County at the township level. There are two comparisons being made (Status Quo vs. Hyper Growth and Hyper Growth vs. Sustainable Hyper Growth). The first comparison illustrates the increase in the levels of population per traffic analysis zone (TAZ). The second comparison shows where development patterns change with the same population.

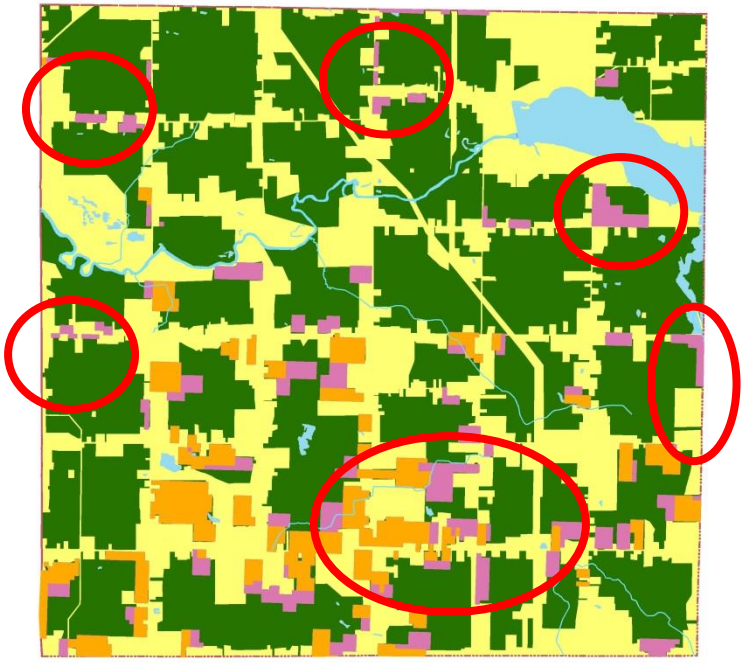
Status Quo 2040



Illustrates development as usual along roadways, moving away from urban areas



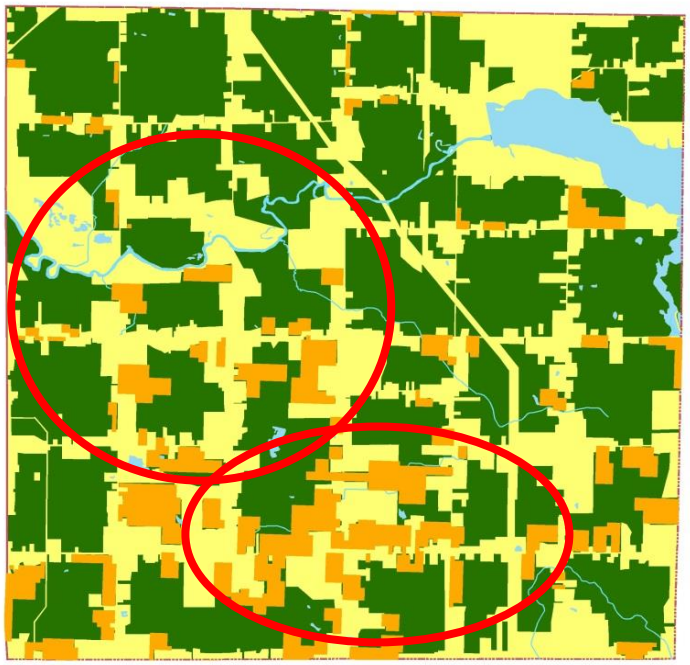
Hyper Growth 2040



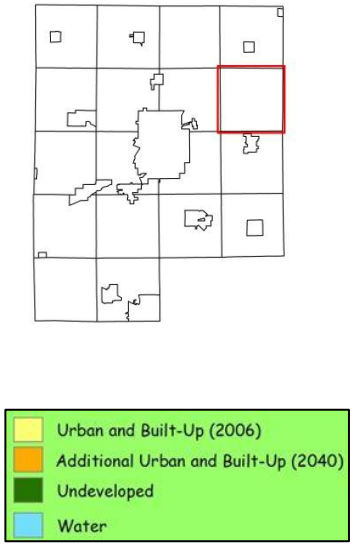
Same development pattern as Status Quo (orange), with increased population (pink)

Community Land Use Profile (continued) **–** Richfield Township

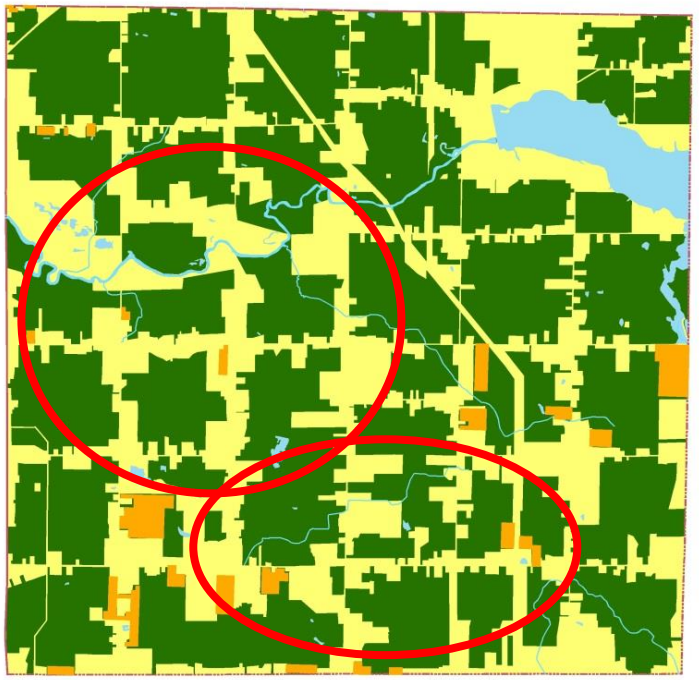
Hyper Growth 2040



Rapid consumption of open space and agricultural land, dispersed development



Sustainable Hyper Growth



Development within urban areas and increasing density, preserving open space

Figure 11: Community Land Use Profile

2040 Scenarios At A Glance				
Evaluation Factors	Status Quo	Sustainable Growth	Hyper Growth	Sustainable Hyper Growth
Urban & Built Up Land Area (acres)	218,066	208,856	231,915	209,359
Lost Farmland & Open Space (acres)	20,281	11,071	34,130	11,574
Increased Infrastructure Costs	$$$	$	$$$$	$$
Increased Need for Public Services	High	Low	Very High	Medium
Impervious Surface	Extensive Increase	Slight Increase	Extensive Increase	Average Increase
Population	423,029	438,435	502,838	502,838
Employment	212,576	212,576	219,683	219,683
Daily Hours of Traffic Delay	7,679	7,341	9,769	9,144
Daily Vehicle Miles Traveled	11,828,444	11,701,426	12,702,831	12,409,275
Congested Lane Miles of Roadway	264	257	275	273
Lane Miles of Road LOS D or Greater	472	464	491	474
% population reached (within a ¼ mile radius) by Fixed-Route Transit (2011-2040)	22.2%	37.2%	35.0%	43.9%
NOx Emissions	4,559	4,524	4,934	4,827
VOC Emissions	4,898	4,875	5,325	5,229

Table 4: 2040 Scenarios at a Glance

Model Analysis

In the summer of 2014, the official population and employment projections were approved for use in the 2040 Long Range Transportation Plan (summary table located in appendix, full methodologies can be found in the Transportation Model Technical Report of the 2040 LRTP). These projections were the basis for the Status Quo scenario. These socioeconomic projections were developed using current U.S. Census data, local building permit information, and the latest forecasting measures. The Status Quo scenario best represents the current policies and regulations in our local units, as well as the changes that will emerge on our roadways if growth and development continue to occur based upon existing trends. Official projections based upon sound methodology and approved processes must be in place to defend against any legal challenges that may occur in relation to this Long Range Transportation Plan. These projections, and the Status Quo scenario that they produce, are the official, approved forecast for Genesee County and have been utilized to project deficiencies on the county transportation system using the Travel Demand Model. While the projections used for the remaining scenarios may not be as concrete as those used for the Status Quo scenario, sound methodology was used develop these valuable planning tools. These "what if" scenarios can be used to peer into the future and help direct decisions about how we want that future to look and feel.

Genesee County Vision

The scenario planning exercise has given us basic data that enables staff, other local planning officials, and transportation agencies to continue dialogue on the ways that transportation and land use are linked and how to manage both effectively and cooperatively. There are a number of indicators used to describe these four scenarios. Based on the findings, each scenario predicts a different development path and raises different quality of life issues for Genesee County residents.

If the "Status Quo" land consumption is allowed to continue, more and more agricultural resources and other valuable lands—estimated at over 20,000 acres— will make way for residential homes and strip commercial developments by the year 2040. As this pattern continues, negative impacts like an increase in infrastructure costs, increased public service needs, reductions in air quality, and more time spent in the car may occur. The Hyper Growth scenario is used to illustrate more intense negative impacts that stem from sprawl development. A lack of responsible growth standards and development guidelines only fuel this consumption pattern. It is certain that there are more efficient ways to utilize land in our county, and with more efficient land use, can come a higher quality of life for area residents.

The Sustainable Growth scenario offers a much more efficient way to handle growth in Genesee County. Not only does this scenario preserve over 9,000 acres of undeveloped land and maximize the use of infrastructure we already have in place, but a number of other positive outcomes are possible as well. The redevelopment of our urbanized areas in place of sprawling subdivisions and strip malls will keep infrastructure costs down, keep the need for costly new schools and public services to an absolute minimum, decrease the amount of vehicle miles we travel on a daily basis, improve air quality, and increase the population reached by the primary transit system. These are all positive outcomes of an improved development strategy. With more efficient development standards and zoning practices in place, the effects of a Hyper Growth scenario would be much more positive as illustrated in the Sustainable Hyper Growth scenario.

The Here and Now

The economic downturn in recent years has played a significant role throughout Genesee County communities. Figures have shown an overall decrease in employment and population between 2005 and 2010. Even with the significant decrease, the county's approved 2040 employment projections indicate a gradual increase in employment overall from 2010 forward and a continued increase in population outside of the City of Flint and neighboring communities. Despite the loss of population and employment, the City of Flint is continuing to invest in the redevelopment of their downtown area focusing heavily on improvements that connect and enhance their valuable sources of higher education. Three college campuses—University of Michigan-Flint, Kettering University, and Mott Community College—all exist within 1 mile of downtown Flint. Area businesses are continuing to relocate downtown and city departments are improving downtown infrastructure to promote more activity in this area. After years of decline and disinvestment, the downtown Flint area is once again showing promise.

Downtown development is not only occurring in Flint, but also in smaller cities and towns throughout the county including City of Grand Blanc, City of Fenton, Mundy Township, and many more. Further efficient growth standards and development guidelines are being looked at by townships in Genesee County. Areas seeing large amounts of growth are looking at their master plans and zoning ordinances and re-evaluating what types of places they are making. While growth and development is commonly viewed as a positive trend, it directly impacts the County's undeveloped lands and natural resources. Communities throughout Genesee County are receiving an increase in the number of requests by landowners to protect and designate their property as farmland and open space under PA 116. This public act allows municipalities, on the behalf of local landowners, to submit an application to the State of Michigan to enter into an agreement to not develop the property except as specifically stated within the agreement.

These are all positive steps toward a positive future that should be encouraged and supported. It should be understood that these are merely projections, and the current economic trends may have an extensive effect on development and population trends over the next 25 years.

Future Development Recommendation

Sustainable Growth Scenario

The four growth scenarios presented in this report have helped shed light on the potential positive and negative impacts on our land, air, roadways, and even our pocketbooks. While capacity deficiencies are based on the Status Quo scenario, the motivation for creating the scenarios was to help formulate a vision of how and where future development should occur in Genesee County. Of the four scenarios evaluated, the Sustainable Growth development scenario was deemed the best as it could potentially preserve over 9,000 acres of farmland and open space, keep costs for new infrastructure and public services down, and concentrate the population reached by the primary transit system. This particular scenario weighs heavily on the positives in a majority of the evaluation categories. In an effort to move toward the Sustainable Growth scenario in the future, the following recommendations have been provided. A number of these recommendations were provided by Governor's Land Use Leadership Council in 2003 and are still relevant today.

- Strengthen and direct development towards existing communities.
- Encourage cities, villages, and townships to work together and adopt common goals for future development.
- Encourage local units to update zoning ordinances and master planning documents and seek commonality with other local units of government to promote smarter growth standards and development guidelines.
- Encourage transportation system maintenance and improvements on the existing infrastructure, while minimizing costly expansion of the system.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Provide a variety of transportation choices.
- Take advantage of compact development design.
- Foster distinctive, attractive communities with a strong sense of place
- Create walkable neighborhoods

Appendix A: "A Changing Landscape: Land Use Analysis & Trends"

A Changing Landscape
Land Use Analysis & Trends

Genesee County, Michigan
October 2006

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www.gcmpc.org

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LIST OF FIGURES

A CHANGING LANDSCAPE

The Genesee County Metropolitan Planning Commission developed this land use analysis with two objectives in mind: to update our "existing" land use inventory on a countywide basis—which had not been done since 1978—and to compare that inventory with the 1978 land use/land cover data. This data will be used to examine the County's growth patterns in the past 25 years. The ability for planning entities to view what is happening on the ground at any specific geographic location throughout the County is an exceptional resource. We have provided this information along with an analysis of different trends and patterns appearing in Genesee County.

Within the past five years, the Michigan Planning Enabling Act has been revised to include language that requires planning agencies to coordinate between jurisdictions when performing land use planning activities. The renewal of our land use data, on a county-wide basis, will play a major role in this coordination. This update will better serve not only our planning efforts, but the efforts of every local unit of government within Genesee County.

Since 1978, many changes have occurred within the county and its individual local units. Not only have these changes occurred in relation to land use, but also in population. Between 1980 and 1990, Genesee County lost 20,000 people primarily associated with a decline in local employment opportunities within the automobile industry. However, since 1990, the population has been back on the rise. The latest U.S. Census report estimates the 2005 population to be nearly 14,000 persons more than in 1990, with populations settling primarily in the southern portion of the county. With the population growing once again, now is the time to focus on land use, because with rapid growth, haphazard planning can often follow. By developing this countywide land use map and producing a summary of our findings, GCMPC would like to assist the local units of government with tools to plan in an orderly fashion.

2006 Existing Land Use

In order to produce the 2006 Existing Land Use inventory, GCMPC staff used a variety of sources and techniques. Local existing land use maps, current parcel and ownership data, and aerial photography were coupled with remote sensing techniques to generate our data. These methods have provided us with an updated inventory of existing land uses in Genesee County (for a complete description of study methodology, see Appendix B). The following is a list of land use categories developed for the 2006 Genesee County Land Use map.

Figure 1

Land Use Categories

This set of land use categories has been developed for the production of the Genesee County Land Use map. All land in Genesee County has been categorized by these classifications.

Single Family Residential – This land use category includes land occupied by single-family dwelling units, seasonal dwellings, manufactured homes outside of designated mobile home parks and their related accessory buildings such as garages.

Multi-Family Residential – This land use category includes land occupied by multiple-family dwelling units such as condominiums, townhouses, duplexes, and apartments along with their related accessory uses such as garages, parking lots, apartment offices, pools, and playgrounds.

Mobile Home Park – Land occupied by mobile dwelling units sited in a planned community, as well as, their related accessory structures and recreational spaces are included in this category.

Commercial – This category includes land mainly occupied for the retail sale and/or service of products. Neighborhood convenience stores, retail outlets, office spaces, financial institutions, repair facilities, gas stations, car dealerships, and shopping malls are among the included uses.

Industrial – This category includes land mainly occupied for product development and manufacturing, with some exceptions. Light manufacturing, as well as, heavy manufacturing are included in this classification. This category applies to land occupied by warehouses, processing facilities, product assembly operations, automotive manufacturing, mining, and non-manufacturing uses which are primarily industrial in nature, such as salvage yards and landfills.

Public & Semi Public – Public uses are land and facilities that are publicly operated and available. These uses include government buildings, schools, community centers, hospitals, and correctional facilities. Semi-public uses are land and facilities which may be privately owned, but are used by the public or a portion of the public. These uses include churches, private clubs, cemeteries, and nursing homes.

Transportation, Communication, and Utilities – This land use category encompasses all road, rail, water, and air transportation facilities; all communication facilities including telephone television, and radio; and all utilities including the production, storage, treatment and transmission of electricity, natural gas, petroleum, solid waste, sewage, and water.

Parks & Recreation – This land use category includes public, semi-public, and private recreational facilities. City parks, and sporting facilities, as well as, campgrounds and golf courses all fit within this category.

Vacant – Vacant lands include vacant city parcels, and small vacant rural parcels.

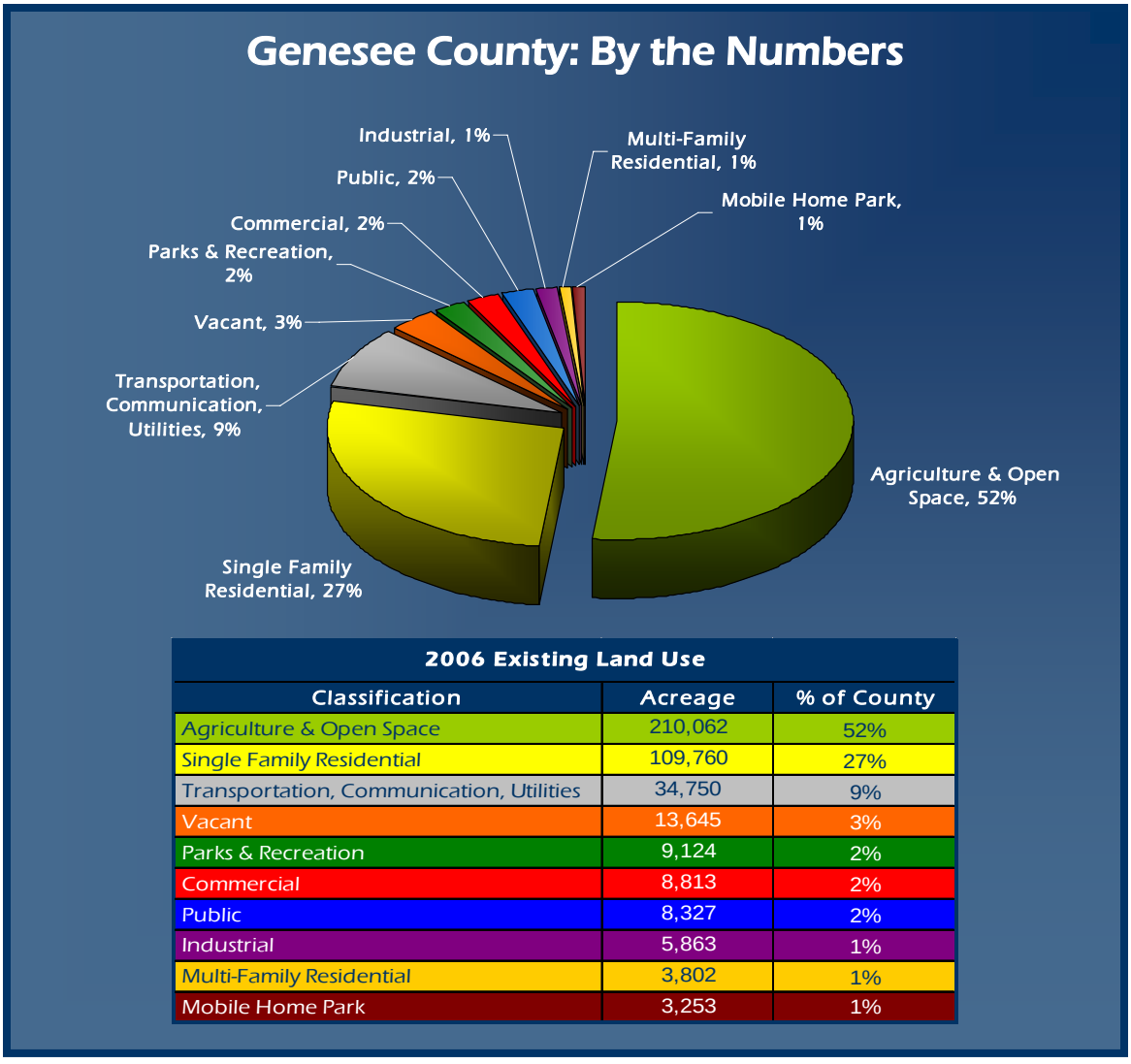
Agriculture & Open Space – This includes agricultural tracts, undeveloped forest land, non-forested vegetation, and wetlands.

Water – Major bodies of water such as Kearsley Reservoir, and the Flint River are included in this category.

Of the nearly 410,000 acres that make up Genesee County, 209,981 of those acres are agricultural and other undeveloped land. But, mainly due to residential development in our rural townships, this number is depleting. Of the remaining land uses, the single family residential (SFR) use dominates the landscape. Clusters of SFR developments are noticeable in and around urban centers throughout the County, but are also developing along nearly all major roadways. A total of 57% of the "built" environment in Genesee County is comprised of SFR development.

Although commercial properties occupy only 2% of land countywide, the commercial development patterns in Genesee County are cause for concern. Commercial strip development, most evident in Figure 1.4 along M-15, M-54, Miller Road and Pierson Road, is a fixture in many communities. This type of development consumes agricultural and open lands while depleting natural resources, impedes pedestrian and non-motorized traffic while producing more conflict points between drivers, fuels further urban sprawl, and often diminishes the sense of place a community possesses. Instead of continuing to build strip commercial corridors, more dense commercial centers present a viable opportunity, often including some residential options to provide a better mix of uses. Providing residential options in and around commercial centers improves the economic viability, while fostering a sense of community.

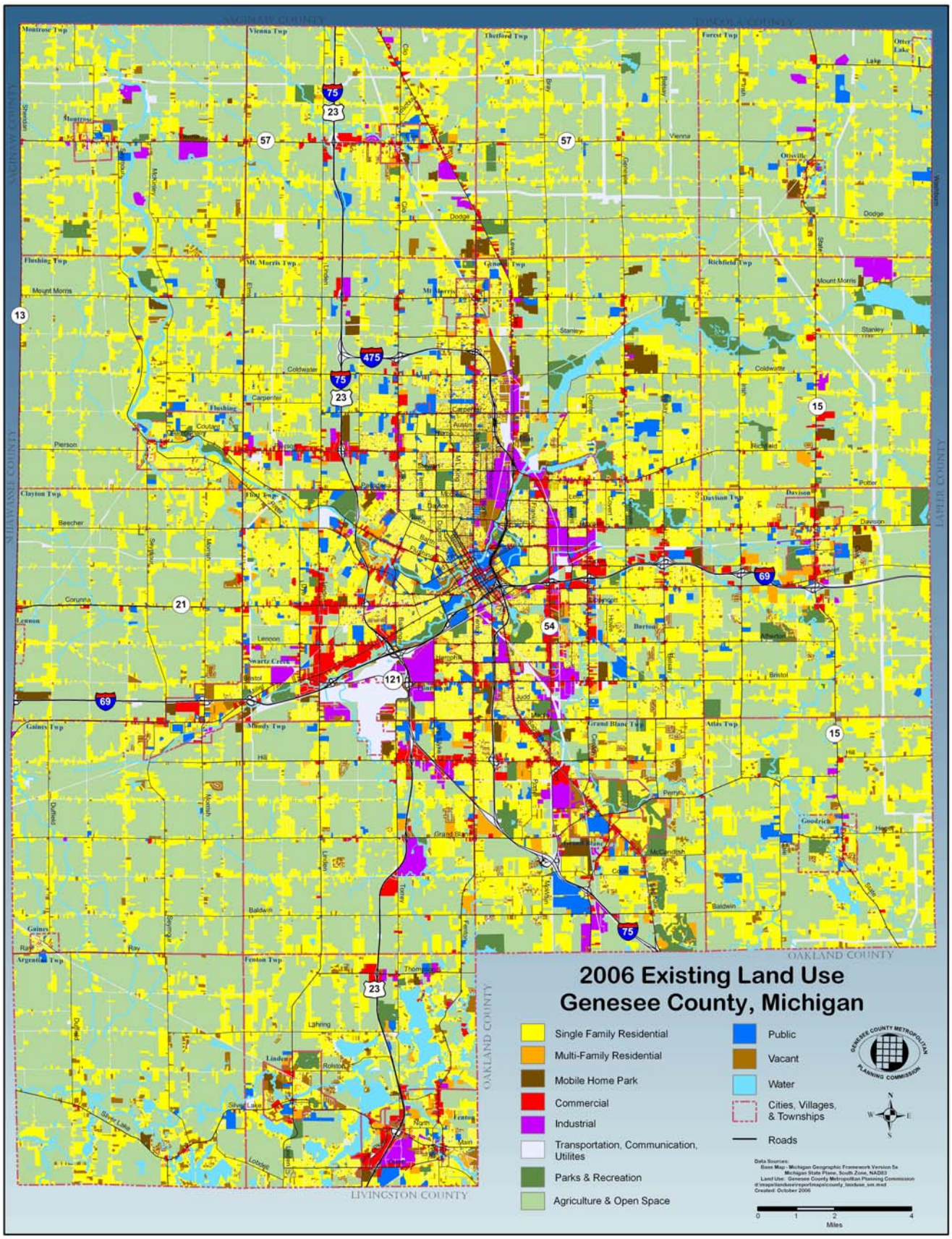
Figure 2



2006 Existing Land Use

Classification	Acreage	% of County
Agriculture & Open Space	210,062	52%
Single Family Residential	109,760	27%
Transportation, Communication, Utilities	34,750	9%
Vacant	13,645	3%
Parks & Recreation	9,124	2%
Commercial	8,813	2%
Public	8,327	2%
Industrial	5,863	1%
Multi-Family Residential	3,802	1%
Mobile Home Park	3,253	1%

Figure 3


2006 Existing Land Use
Genesee County, Michigan
Single Family Residential
Multi-Family Residential
Mobile Home Park
Commercial
Industrial
Transportation, Communication, Utilites
Parks & Recreation
Agriculture & Open Space
Public
Vacant
Water
Cities, Villages, & Townships
Roads
Miles
SAGINAW COUNTY
SHIAWASSEE COUNTY
LAPEER COUNTY
OAKLAND COUNTY
LIVINGSTON COUNTY

Genesee County: Now & Then

In the late 1970's and early 1980's, at the time when the last land use inventory was completed, Genesee County's population was at its peak. The top employer in the area at this time, General Motors Corporation, maintained a very large employee base. Largely due to their major hiring trends in the 60's and 70's, Genesee County's population was booming. Homes, as well as, other land uses like schools, churches, restaurants, and retail outlets were being built at an unseen rate. Genesee County was prospering.

Figure 4

Genesee County Population Change

Local Unit	1980	1990	2005	# Change 1980-2005	% Change 1980-2005
Genesee County	450,440	430,459	443,883	-6,557	-1%
Argentine Township	4,180	4,651	7,181	3,001	72%
Atlas Township	4,096	5,551	7,770	3,674	90%
Clayton Township	7,269	7,368	7,873	604	8%
Davison Township	13,708	14,671	18,650	4,942	36%
Fenton Township	9,570	10,055	14,655	5,085	53%
Flint Township	35,405	34,081	33,023	-2,382	-7%
Flushing Township	9,246	9,223	10,501	1,255	14%
Forest Township	3,559	4,409	4,806	1,247	35%
Gaines Township	4,769	5,391	6,746	1,977	41%
Genesee Township	25,065	24,093	24,245	-820	-3%
Grand Blanc Township	24,413	25,392	35,125	10,712	44%
Montrose Township	6,164	6,236	6,417	253	4%
Mt. Morris Township	27,928	25,198	23,302	-4,626	-17%
Mundy Township	10,786	11,511	14,042	3,256	30%
Richfield Township	6,895	7,217	8,762	1,867	27%
Thetford Township	8,499	8,333	8,160	-339	-4%
Vienna Township	12,914	13,210	13,596	682	5%
City of Burton	29,976	29,976	30,916	940	3%
City of Clio	2,669	2,629	2,619	-50	-2%
City of Davison	6,087	5,693	5,372	-715	-12%
City of Fenton	8,098	8,444	11,901	3,803	47%
City of Flint	159,611	140,761	118,551	-41,060	-26%
City of Flushing	8,624	8,542	8,110	-514	-6%
City of Grand Blanc	6,848	7,760	7,898	1,050	15%
City of Linden	2,174	2,415	3,452	1,278	59%
City of Montrose	1,706	1,811	1,552	-154	-9%
City of Mt. Morris	3,246	3,292	3,321	75	2%
City of Swartz Creek	5,013	4,851	5,341	328	7%
Village of Gaines	440	427	363	-77	-18%
Village of Goodrich	795	916	1,567	772	97%
Village of Lennon	474	474	505	31	7%
Village of Otisville	682	724	845	163	24%
Village of Otterlake	534	534	428	-106	-20%

However, during the 1980's, General Motors suffered some of their leanest times. The 1980's claimed the first decline in Genesee County history, losing 4.5% of the population: a loss totaling roughly 20,000 people.

Since the population decline of the 1980's, Genesee County numbers have been back on the rise, but not nearly at the rates seen in the 60's and 70's. In 1999, General Motors closed the Buick City plant in Flint, Michigan, ending the production of Buick automobiles in the city. At the height of production, this plant employed 28,000 workers, yet at closure only employed 1200. This decline in employment opportunity caused similar declines in other sectors, fueling the population decrease seen in the 80's that Genesee County is only now beginning to recover from. Although we have only marginally increased our population since the 80's, the urbanization of the County has continued into the present time at a comparable rate to the building boom seen in the 60's and 70's. Recently, there has been another shift in employment in Genesee County. Buyouts and layoffs by the Delphi Corporation and General Motors have further decreased the manufacturing employment opportunities in the County. With Delphi possibly closing its doors here, the future of manufacturing jobs in Genesee County is uncertain; and it will take time to realize the effects on our social, economic, and physical landscapes

The Built Environment

Since 1978, Genesee County has developed at a rapid rate. Countywide, developed land has increased by 85%, while the county lost 31% of its undeveloped land. This undeveloped land, consisting mainly of farmland, forested lands, rangelands, and wetlands, is being consumed by development. Notice the vast increase in the built environment from 1978 to 2006 in Figures 6 and 7.

Since 1978, roughly 90,000 acres of land in the county has been developed, yet the County's population decreased by 1%. While some local units are experiencing significant land development growth and significant population growth, the majority of locales are seeing rapid land consumption accompanied by little or no population growth.

Figure 5

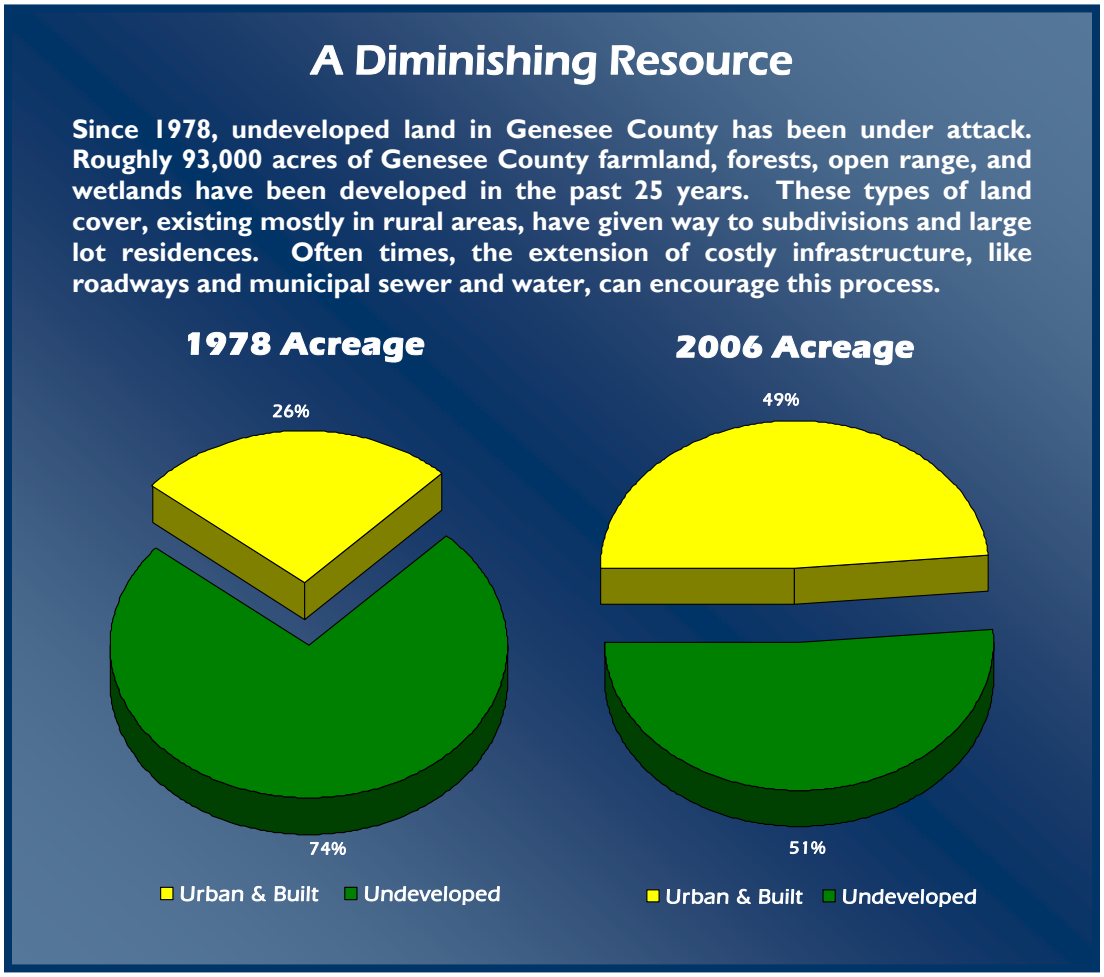


Figure 6

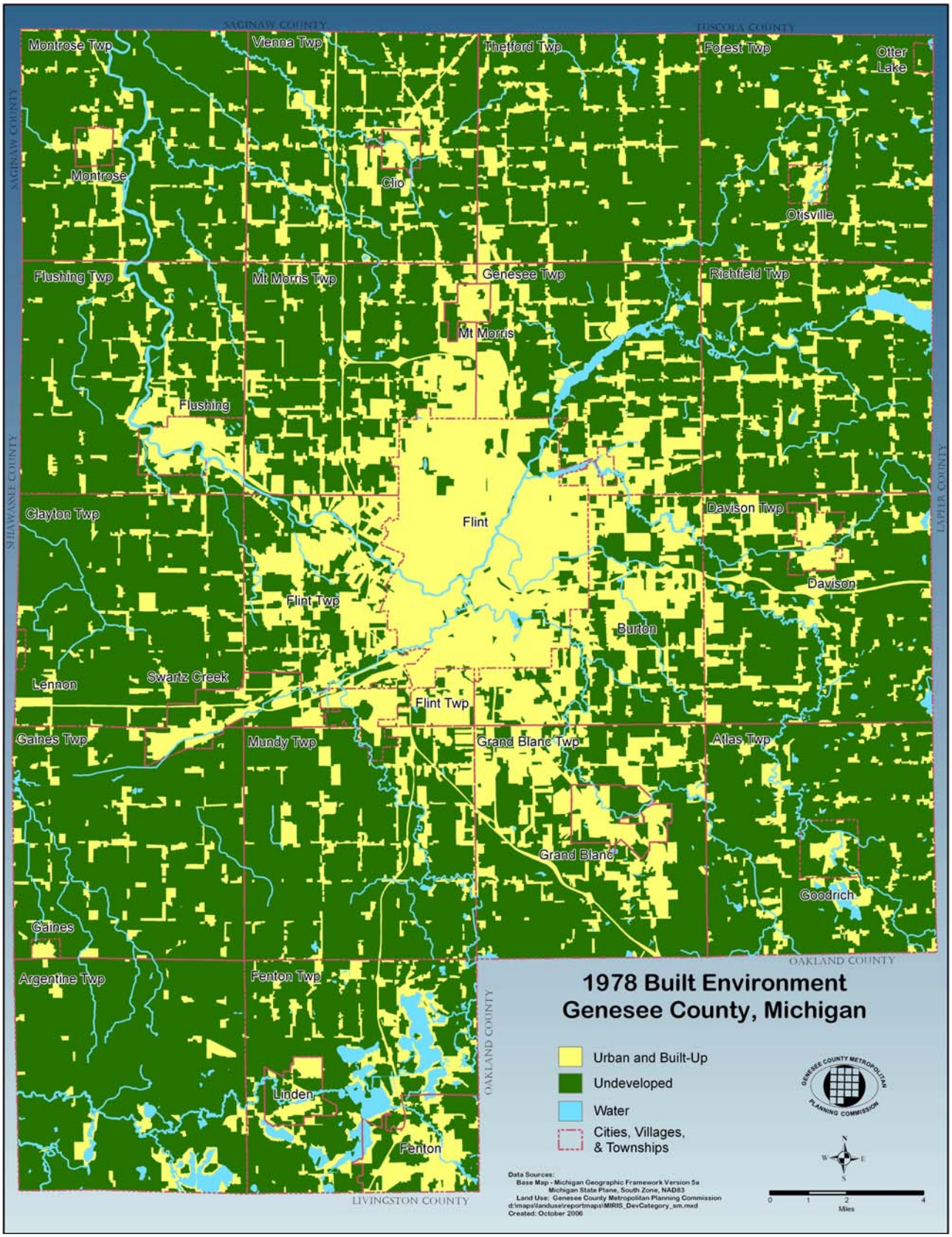

SAGINAW COUNTY
TUSCOLA COUNTY
SHIAWASSEE COUNTY
LAPEER COUNTY
OAKLAND COUNTY
LIVINGSTON COUNTY
Montrose Twp
Vienna Twp
Thetford Twp
Forest Twp
Otter Lake
Montrose
Clio
Otisville
Flushing Twp
Mt Morris Twp
Genesee Twp
Richfield Twp
Mt Morris
Flushing
Clayton Twp
Flint
Davison Twp
Davison
Flint Twp
Burton
Lennon
Swartz Creek
Flint Twp
Gaines Twp
Mundy Twp
Grand Blanc Twp
Atlas Twp
Grand Blanc
Goodrich
Gaines
Argentine Twp
Fenton Twp
Linden
Fenton
1978 Built Environment
Genesee County, Michigan
Urban and Built-Up
Undeveloped
Water
Cities, Villages, & Townships
Data Sources:
Base Map - Michigan Geographic Framework Version 5a
Michigan State Plane, South Zone, NAD83
Land Use: Genesee County Metropolitan Planning Commission
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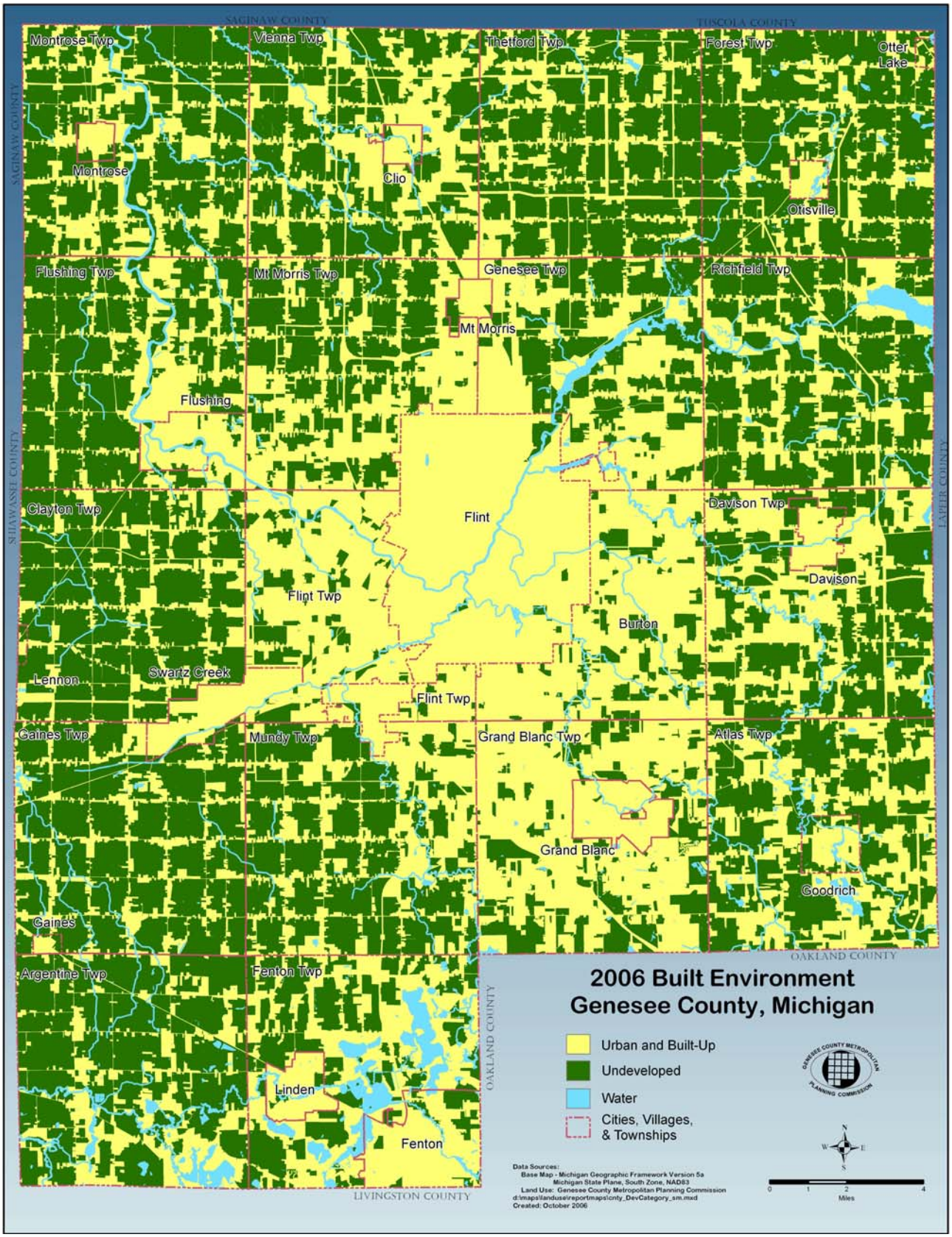
Figure 7


SAGINAW COUNTY
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Land Use: Genesee County Metropolitan Planning Commission
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Created: October 2006
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Figure 8

Land Use Comparison

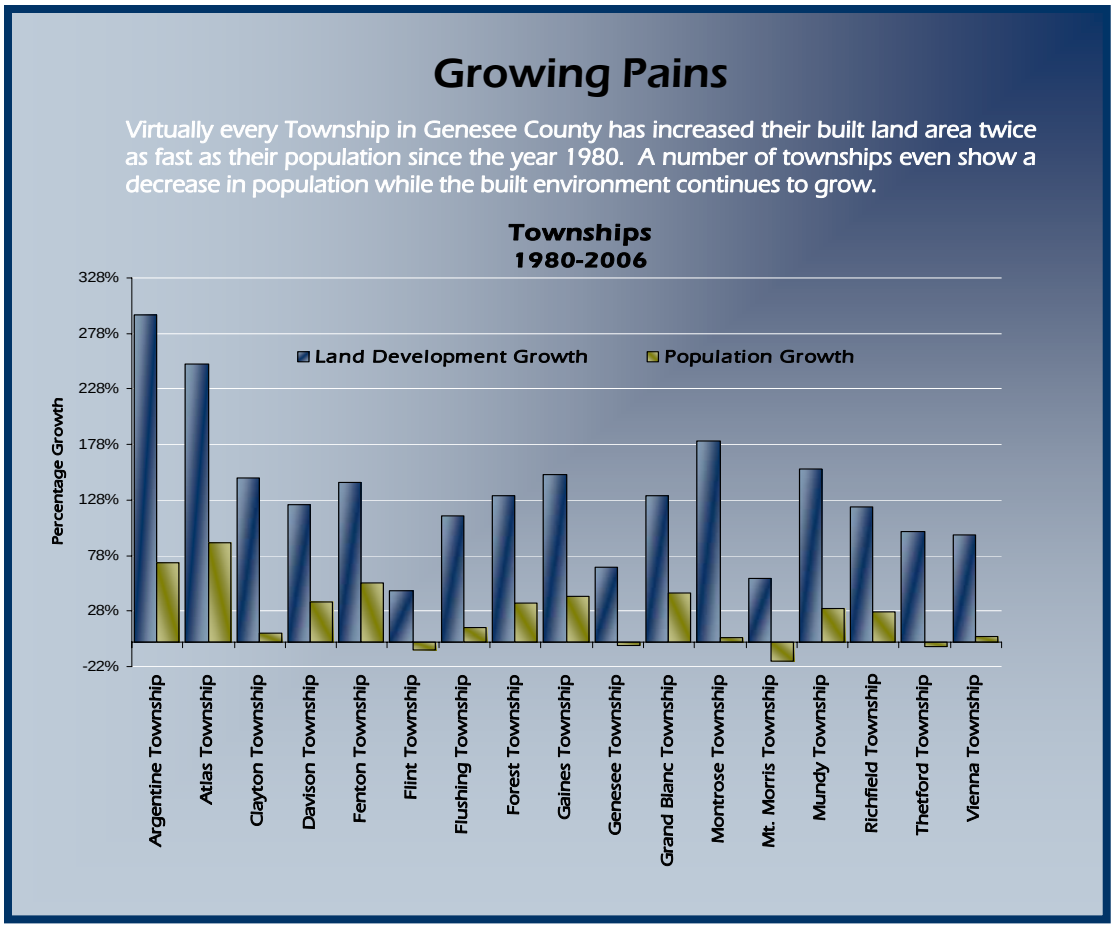
Local Unit	Acreage Type	1978 Acreage	2006 Acreage	Acreage Change	% Acreage Change
Genesee County	Urban & Built	107,126	197,785	90,659	85%
	Undeveloped	302,700	209,619	-93,081	-31%
Argentine Township	Urban & Built	1,556	6,140	4,584	295%
	Undeveloped	20,821	16,005	-4,816	-23%
Atlas Township	Urban & Built	2,751	9,659	6,908	251%
	Undeveloped	18,372	11,415	-6,957	-38%
Clayton Township	Urban & Built	2,309	5,737	3,428	148%
	Undeveloped	19,433	15,975	-3,458	-18%
Davison Township	Urban & Built	4,648	10,396	5,748	124%
	Undeveloped	16,721	10,904	-5,817	-35%
Fenton Township	Urban & Built	3,318	8,089	4,771	144%
	Undeveloped	11,944	6,979	-4,965	-42%
Flint Township	Urban & Built	8,361	12,248	3,887	46%
	Undeveloped	6,592	2,617	-3,975	-60%
Flushing Township	Urban & Built	3,201	6,844	3,643	114%
	Undeveloped	16,912	13,238	-3,674	-22%
Forest Township	Urban & Built	2,612	6,066	3,454	132%
	Undeveloped	19,383	15,960	-3,423	-18%
Gaines Township	Urban & Built	2,141	5,365	3,224	151%
	Undeveloped	20,080	16,815	-3,265	-16%
Genesee Township	Urban & Built	6,503	10,950	4,447	68%
	Undeveloped	12,130	7,666	-4,464	-37%
Grand Blanc Township	Urban & Built	6,592	15,315	8,723	132%
	Undeveloped	14,408	5,610	-8,798	-61%
Montrose Township	Urban & Built	2,632	7,398	4,766	181%
	Undeveloped	19,292	14,541	-4,751	-25%
Mt. Morris Township	Urban & Built	6,425	10,117	3,692	57%
	Undeveloped	13,736	10,051	-3,685	-27%
Mundy Township	Urban & Built	3,616	9,252	5,636	156%
	Undeveloped	19,445	13,793	-5,652	-29%
Richfield Township	Urban & Built	3,710	8,222	4,512	122%
	Undeveloped	18,835	14,189	-4,646	-25%
Thetford Township	Urban & Built	3,437	6,884	3,447	100%
	Undeveloped	18,682	15,220	-3,462	-19%
Vienna Township	Urban & Built	4,909	9,675	4,766	97%
	Undeveloped	17,494	12,695	-4,799	-27%
City of Burton	Urban & Built	7,583	12,093	4,510	59%
	Undeveloped	7,391	2,838	-4,553	-62%
City of Clio	Urban & Built	430	587	157	36%
	Undeveloped	280	124	-156	-56%
City of Davison	Urban & Built	828	987	159	19%
	Undeveloped	438	200	-238	-54%
City of Fenton	Urban & Built	2,000	3,665	1,665	83%
	Undeveloped	2,206	662	-1,544	-70%
City of Flint	Urban & Built	19,192	20,993	1,801	9%
	Undeveloped	2,236	503	-1,733	-78%
City of Flushing	Urban & Built	1,690	2,058	368	22%
	Undeveloped	618	251	-367	-59%
City of Grand Blanc	Urban & Built	1,414	2,138	724	51%
	Undeveloped	886	157	-729	-82%
City of Linden	Urban & Built	703	1,323	620	88%
	Undeveloped	824	166	-658	-80%
City of Montrose	Urban & Built	371	476	105	28%
	Undeveloped	254	149	-105	-41%
City of Mt. Morris	Urban & Built	489	547	58	12%
	Undeveloped	246	188	-58	-24%
City of Swartz Creek	Urban & Built	1,276	2,376	1,100	86%
	Undeveloped	1,327	226	-1,101	-83%
Village of Gaines	Urban & Built	151	164	13	8%
	Undeveloped	87	74	-13	-15%
Village of Goodrich	Urban & Built	408	919	511	125%
	Undeveloped	1,003	479	-524	-52%
Village of Lennon	Urban & Built	29	67	38	132%
	Undeveloped	122	84	-38	-31%
Village of Otisville	Urban & Built	273	475	202	74%
	Undeveloped	279	82	-197	-71%
Village of Otterlake	Urban & Built	12	68	56	467%
	Undeveloped	223	169	-54	-24%

Land use trends in Genesee County have relied on heavy land consumption with increased development being aimed at agricultural lands and open space. A survey of our townships, cities, and villages reveals that growth in Genesee County is occurring mainly in areas outside of our core urban districts while concentrating in the more rural areas.

Townships

In the general sense, townships in Genesee County are urbanizing rapidly yet adding population only at a medium pace. The southern townships; Atlas, Argentine, Grand Blanc, Mundy, Davison, Gaines and Fenton are urbanizing quickly but are also adding substantial populations. Significant land consumption has occurred in the northern townships as well, but these areas show very low increases or even a decline in population. Montrose, Vienna, Thetford, Forest, and Clayton townships are consuming land at a rate nearly 10 times faster than they are adding population. The more urban townships like Genesee, Mt. Morris, and Flint are urbanizing much slower and experiencing much slower population growth. Both Flushing and Richfield Township have experienced similar conditions with extensive land consumption and moderate increases in population occurring here.

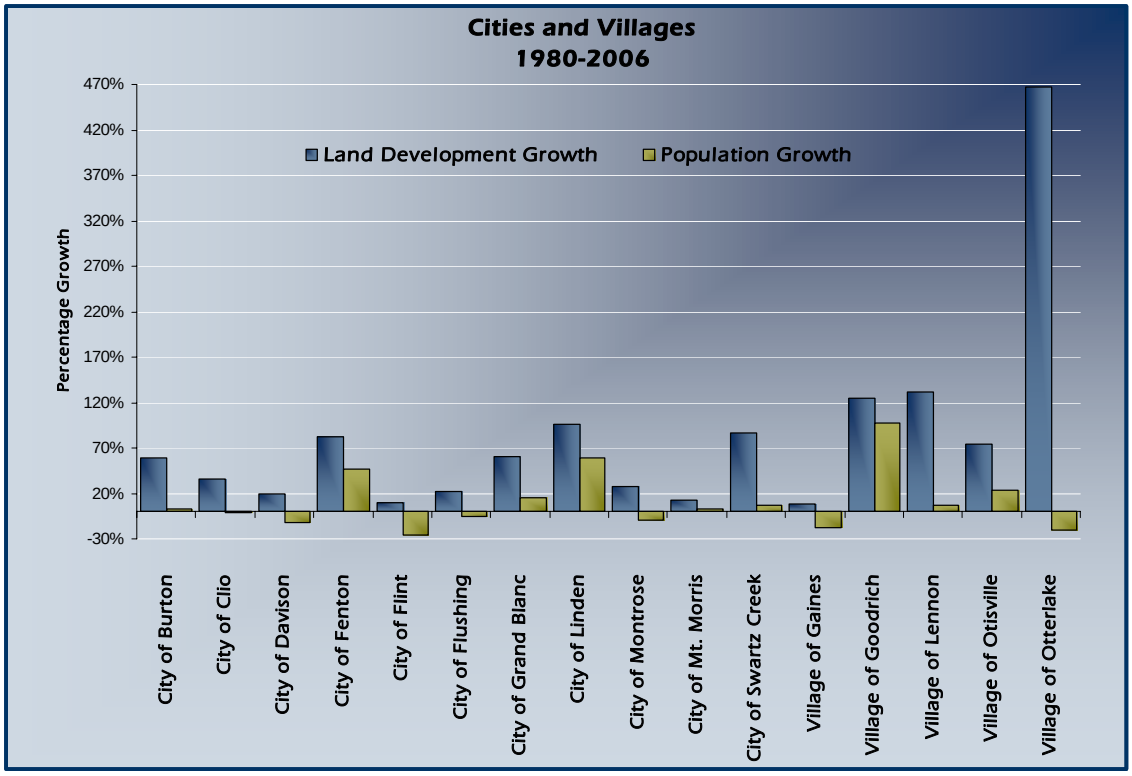
Figure 9



Cities and Villages

Population trends within Genesee County cities and villages are comparable to those of their respective townships. Cities like Linden, Fenton, and Grand Blanc are booming while Flint, Davison, Montrose, and Flushing are in fact losing population. In terms of land use and land consumption, most cities are still urbanizing and consuming undeveloped land, but not nearly at the rate of the townships. This trend is based mainly on the fact that the amount of undeveloped land in cities and villages is much less prevalent than in most townships. Even though the data demonstrates that many of the cities and villages are "built out," they should still be targeted for growth. The redevelopment of brownfields and abandoned properties is an excellent use of available land.

Figure 10



City of Flint

The trends and patterns experienced within the City of Flint are unique within themselves. This core urban area has seen large population decline and a minimum of new development. There is an abundance of available land, serviced by a multitude of roadways, as well as sewer, water, and electricity, yet we choose to build primarily in the out-county region. While these large swaths of urban land sit vacant, or occupied by vacant structures, there are millions of dollars in subsidies available through the Michigan Brownfield Grant and Loan Fund, Brownfield Assessment Grants, and the Brownfield Tax

Increment Financing program to help aid in their redevelopment. The redirection of development into these areas, where the infrastructure already exists, may prove more economical, and at the same time preserve valuable land and resources.

Future Planning

Through the development of this study, the Genesee County Metropolitan Planning Commission hopes to encourage more collaboration across jurisdictional lines when planning new development in our communities. The concept of planning on a more regional scale just seems to make more sense.

The fault, however, of the intense land consumption in Genesee County, can not be exclusively bestowed upon the shoulders of local government. The local units around the county must perform a "balancing act." Local leaders often find it difficult to turn down development that will increase their tax base; while at the same time, they realize that the preservation of our open spaces is important. Many times, especially with the present economic conditions in Genesee County, more development followed by more tax revenue severely outweighs the need to preserve land. This challenge that our communities face is just one more adversity in the fight against sprawl in Genesee County.

Unfortunately, the numbers reveal that we are not using our land efficiently. Subdivisions and strip malls continue to pop up at the expense of farm fields and forests. Special attention should be given to local farmland and other open spaces. If we continue to consume land at the rate we have in the past 25 years, our agricultural resources and wild lands will be greatly depleted. Higher densities, urban redevelopment, growth standards, and development guidelines are viable options to combat urban sprawl and land consumption. With the use of more efficient land use planning techniques, and a better knowledge of our current land use patterns, local officials can make more informed decisions about future development.

Methodology

The Genesee County land use map has been completed with the use of current parcel data, aerial photography, ownership data, existing land use maps, and remote-sensing techniques. Although the newest data set is labeled as "2006" the data used was a hybrid between 2005 parcel data and 2002 aerial photography.

Due to the strip development patterns employed throughout our communities in the past 25 years, simply using parcel data to complete this study would not achieve the desired result. Throughout the life of the project, these development patterns often required GCMPC staff to split parcels and assign two different land uses. Where a "built" land use occurs on a small portion of the parcel, and another "undeveloped" use occurs on the remaining majority of the parcel, this parcel was split to accurately reflect the conditions at ground level. The use of this methodology was needed to make an accurate comparison to the 1978 MIRIS data.

MIRIS Layer

In order to demonstrate how and where our county has been growing, GCMPC has performed an analysis of our current land use patterns in relationship to the MIRIS Land Use/Land Cover data. For study purposes, we have used two main classifications, "Urban & Built Up" and "Undeveloped," to analyze Genesee County land use patterns from 1978 to the present.

All land uses in Genesee County are categorized into:

- **Urban & Built Up**
- **Undeveloped**
- **Water**

These classifications were developed to provide an accurate analysis of development patterns experienced in Genesee County since 1978. This classification system was modeled around the *Michigan Land Resource Project*, prepared by Public Sector Consultants in 2001. The table below illustrates how the original land use classifications fit into the broader categories.

Genesee County Land Use Analysis		
	MIRIS Land Use/Land Cover	**Countywide Land Use**
Urban & Built-Up	Residential; Commercial, Services, Insitutional; Industrial; Transportation, Communication, Utilities; Mixed; Extractive; Open & Other	Single Family Residential; Multi-Family Residential; Mobile Home Park; Commercial; Industrial; Public & Semi-Public; Parks & Recreation; Vacant
Undeveloped	Agriculture, Rangeland, Forestland, Wetland	Agriculture & Open Space
Water	Water	Water

Other Issues

Residential Properties

The use of the current parcel layer allows us to code parcels that are classified as residential. However, many of the developed parcels are only partially inhabited by structures while the remainder of the parcel is inhabited by agricultural land, forested lands, non-forested open lands, and/or wetlands. After coding these parcels as residential or commercial, all parcels 5 acres or larger in size were checked and split if it was necessary to accommodate another use. In the case where a number of adjacent parcels smaller than 5 acres combined to form a larger land area, these parcels were also split to retain accuracy against the MIRIS data.

Developed Non-Residential Properties

All properties classified as "201" in the parcel layer were checked to determine their use due to other property types such as public uses, industrial uses, and recreational uses being coded under this classification. Local existing land use maps, aerial photography, and ownership data was used to determine which use type actually existed on each parcel.

Vacant Parcels

Similar to the coding of the residential properties, the parcel layer was used to code vacant parcels as well. Parcels less than 5 acres in size that were classified as "vacant" were left with this classification. Those parcels 5 acres or larger in size were checked and split, or changed, if it was necessary to accommodate another use.

Appendix B: 2040 Population Projections

Genesee County 2040 Long Range Transportation Plan Population Projections

LUG	Pop 2005	Pop 2010	Pop 2012	Pop 2015	Pop 2020	Pop 2025	Pop 2030	Pop 2035	Pop 2040	2010 to 2040 Change	2010 to 2040 % Change
Argentine Twp	6,943	6,913	6,903	6,926	7,069	7,236	7,425	7,638	7,886	973	14.1%
Atlas Twp	6,215	6,133	6,102	6,085	6,139	6,267	6,412	6,576	6,768	635	10.4%
Burton City	31,305	29,999	29,874	29,742	29,700	30,065	30,473	31,068	31,821	1,822	6.1%
Clayton Twp	7,700	7,611	7,591	7,602	7,730	7,901	8,096	8,319	8,581	970	12.7%
Clio City	2,586	2,646	2,628	2,605	2,584	2,602	2,626	2,661	2,711	65	2.5%
Davison City	5,529	5,173	5,136	5,083	5,008	4,988	4,973	4,989	5,046	-127	-2.5%
Davison Twp	19,180	19,575	19,512	19,551	19,986	20,606	21,292	22,055	22,932	3,357	17.1%
Fenton City	11,625	11,746	11,771	11,878	12,201	12,344	12,466	12,628	12,861	1,115	9.5%
Fenton Twp	14,665	15,552	15,554	15,689	16,274	16,953	17,647	18,331	19,020	3,468	22.3%
Flint City	120,283	102,486	99,416	93,009	82,543	77,343	72,527	69,646	67,133	-35,353	-34.5%
Flint Twp	33,720	31,890	31,739	31,526	31,251	31,281	31,203	31,310	31,646	-244	-0.8%
Flushing City	8,464	8,389	8,352	8,306	8,268	8,332	8,364	8,429	8,541	152	1.8%
Flushing Twp	10,596	10,640	10,604	10,585	10,661	10,779	10,931	11,120	11,363	723	6.8%
Forest Twp	3,931	3,838	3,820	3,800	3,789	3,829	3,868	3,921	3,993	155	4.0%
Gaines Twp	6,420	6,442	6,436	6,460	6,592	6,736	6,900	7,086	7,305	863	13.4%
Gaines Village	450	380	379	378	377	375	375	377	380	0	0.0%
Genesee Twp	23,981	21,595	21,513	21,395	21,237	21,259	21,159	21,164	21,300	-295	-1.4%
Goodrich Village	1,566	1,860	1,855	1,868	1,940	2,045	2,155	2,271	2,396	536	28.8%
Grand Blanc City	8,078	8,276	8,227	8,181	8,187	8,257	8,358	8,492	8,674	398	4.8%
Grand Blanc Twp	35,075	37,500	37,527	37,878	39,312	40,903	42,421	43,970	45,734	8,234	22.0%
Linden City	3,603	3,991	3,997	4,029	4,142	4,239	4,342	4,417	4,514	523	13.1%
Montrose City	1,552	1,657	1,648	1,639	1,635	1,656	1,679	1,707	1,745	88	5.3%
Montrose Twp	6,496	6,224	6,203	6,180	6,172	6,232	6,290	6,380	6,499	275	4.4%
Mt Morris City	3,448	3,127	3,119	3,111	3,118	3,168	3,209	3,282	3,393	266	8.5%
Mt Morris Twp	23,795	21,460	21,421	21,370	21,331	21,477	21,422	21,482	21,684	224	1.0%
Mundy Twp	14,810	15,063	15,076	15,253	15,975	16,820	17,710	18,656	19,695	4,632	30.8%
Otisville Village	903	864	862	861	863	861	862	867	875	11	1.3%
Richfield Twp	8,726	8,730	8,690	8,684	8,823	9,073	9,349	9,654	10,005	1,275	14.6%
Swartz Creek City	5,493	5,726	5,696	5,706	5,819	5,969	6,140	6,334	6,564	838	14.6%
Thetford Twp	8,385	7,049	7,039	7,029	7,034	7,107	7,118	7,176	7,288	239	3.4%
Vienna Twp	13,627	13,255	13,228	13,248	13,449	13,681	13,957	14,282	14,677	1,422	10.7%
	449,150	425,790	421,919	415,657	409,210	410,384	411,749	416,286	423,030	-2,760	-0.6%

Appendix C: 2040 Employment Projections

Genesee County 2040 Employment Projections by Sector

Employment Sector	2005	2010	2015	2020	2025	2030	2035	2040
Manufacturing	24,433	10,415	10,672	10,398	9,948	9,630	9,267	8,909
Other	12,677	9,798	10,840	11,333	11,374	11,274	11,007	10,766
Transportation and Public Utilities	5,768	4,501	4,667	4,724	4,725	4,802	4,973	5,176
Finance, Insurance and Real Estate	14,400	15,778	16,671	17,264	16,945	16,528	16,223	15,911
Retail Trade	27,984	24,291	24,125	23,956	23,451	22,838	22,618	22,315
Wholesale Trade	7,244	5,772	5,775	5,767	5,728	5,638	5,524	5,337
Services	92,713	88,040	95,427	103,017	109,041	111,229	114,412	117,516
Government	26,443	24,731	24,105	25,570	25,875	26,123	26,433	26,646
Total	**211,662**	**183,326**	**192,282**	**202,029**	**207,087**	**208,062**	**210,457**	**212,576**